EIGHTH

ANNUAL REPORT

OF

THE DEPUTY MASTER OF THE MINT.

1877.

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Presented to both Houses of Parliament by Command of Her Majesty.

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THE DEPUTY MASTER OF THE MINT.

SIR,

I HAVE the honour to submit, for the consideration of the Lords Commissioners of Her Majesty's Treasury, my Eighth Annual Report on the Royal Mint.

The operations of the year 1877 offer no special feature, except the small amount of the gold coinage, which was again confined, as in 1875, to half-sovereigns. In consequence of the moderate demand for coin caused by the continued depression of trade, the resources of the Mint have proved sufficient during the year to maintain the supply of Imperial coin, and to meet a part of the requirements of Colonies having local currencies; but it has been necessary, as in former years, to make arrangements for the execution of some of the Colonial coinages by contract.

Coinages executed during the year.

The coins struck at the Mint during the year 1877 were of fifteen different denominations, namely:—

British Coinage.

Gold.—Half-sovereigns.
Silver.—Half-crowns.
Florins.
Shillings.
Sixpences.
Fourpences (Maundy money only).
Threepences.
Twopences (Maundy money only).
Pence (do.).
Bronze.—Pence.
Halfpence.

Straits Settlements.

Silver.—Twenty Cents.
Ten Cents.
Five Cents.

Hong Kong.

Bronze.—Cents.

The total number of pieces struck at the Mint was 30,131,130, as against 11,239,050 in 1876, and their value, real or nominal, 1,567,936*l.* 15*s.* 6½*d.**

The total number of British coins struck during the year was 27,856,130, and their value as follows:—

	£	s.	d.	£	s.	d.
Gold:						
Half-sovereigns - -	1,098,741	0	0			
				1,098,741	0	0
Silver:						
Half-crowns - -	55,882	7	6			
Florins - - - -	68,229	4	0			
Shillings - - -	149,035	3	0			
Sixpences - - -	101,662	3	0			
Fourpences (Maundy) -	80	16	8			
Threepences - - -	32,836	0	3			
Twopences (Maundy) -	59	18	2			
Pence (do.) -	37	4	8			
				407,822	17	3
Bronze:						
Pence - - -	40,103	2	3			
Halfpence - - -	10,853	2	8½			
				50,956	4	11½
Making a total of - - -				1,557,620	2	2½

Gold coinage.

It will be seen from these figures that the gold coinage of 1877, which did not begin till the 15th of November, has only amounted to 1,098,000*l.*, and has been confined, as in 1875, to half-sovereigns; but since the beginning of the current year the coinage of gold has been resumed, and a sum of 1,692,200*l.* in sovereigns and half-sovereigns has been delivered to the Bank of England. The smallness of the demand for gold coin may again be traced to the importation of sovereigns from Australia, the amount of those coins struck at the Sydney and Melbourne Mints which were received at the Bank of England during the year having risen to 3,748,000*l.*, as against 2,075,000*l.* in 1876, and 2,726,000*l.* in 1875. Their Lordships are aware that in the absence of these large supplies the Mint could only keep pace with the demand for gold coin, even when that demand is inconsiderable, by making arrangements for the performance of other parts of its legitimate work by contract.

Importation of light gold coin for re-coinage.

The light gold coin withdrawn from circulation and sent in to the Mint for re-coinage has again formed an important item in the total amount of gold imported by the Bank of England. The total weight of gold bullion delivered for coinage during the

* For detailed statement, see Appendix, page 38.

year 1877 was 487,594 ounces, and of this no less than 400,000 ounces, or 1,557,500*l.*, consisted of worn coin, as against 638,575*l.* re-coined in 1876, and 2,129,881*l.* in 1875.

Silver coinage.

In the year 1876, as stated in my last Report,* the operations of the coinage were entirely suspended, in consequence of a break-down of machinery, for a period of nearly five months, and the stock of silver coin in the Mint could not be maintained at its proper level. The amount of silver coined during that year, therefore, was necessarily much below the average, and only reached the sum of 234,232*l.* In 1877 the amount coined was 407,822*l.*, and the amount issued 424,701*l.*, as against 702,990*l.* in 1875, and far larger sums in former years.

Of the silver coin issued during the year, 186,300*l.* was sent to the Bank of England, 10,000*l.* to the Bank of Ireland, 94,000*l.* to Scotch Banks, and 94,475*l.* to the Colonies, the remainder consisting of 28,140*l.* shipped for the use of Treasury Chests abroad, and 11,400*l.* in threepences supplied to private persons. It will be observed that the demand for threepences, as well as for other denominations of coin, has been affected by the state of trade. In 1874, the issues of these coins, which had been very large in the previous year, amounted to no less than 51,525*l.*, or 4,122,090 pieces; but since that year the demand has steadily decreased, and the issues of 1877 have been almost identical with those of 1870. It should be stated that during a part of the year, as in 1876, applicants for small sums in threepences were not supplied directly by the Mint, but were again referred to a London Bank known to hold a surplus stock of those coins.

The half-crowns issued during the year were of the nominal value of 91,700*l.*, and raise the total amount issued since May 1874, when the coinage of half-crowns was resumed, to 542,900*l.*

England.

I append a statement, in continuation of those given in former Reports, showing the amount of silver coin issued by the Mint to the Bank of England, and by the Bank to the public, with the amount of worn coin withdrawn from circulation by the Bank, during recent years:—

Year.	Received by the Bank from the Mint.	Issued by the Bank to the Public.	Received by the Bank from the Public.	Worn Coin withdrawn from Circulation.
	£	£	£	£
1867	87,000	—	17,000	60,000
1868	175,000	193,000	—	75,000
1869	30,000	228,000	—	105,000
1870	188,000	328,000	—	80,000
1871	566,000	650,000	—	75,000
1872	972,000	910,000	—	65,000
1873	578,000	595,000	—	95,000
1874	500,000	432,000	—	115,000
1875	481,000	433,000	—	143,000
1876	87,000	57,000	—	275,000
1877	186,300	66,000	—	170,000

* Seventh Annual Report (1876), page 5.

It will be seen that during the year 1877 the Bank of England received from the Mint nearly 100,000*l.* more in silver coin than in the preceding year, but this increase of issue is in some degree to be accounted for by the fact that at the close of 1876, as stated in my Report for that year,* owing to the inability of the Mint to coin, there had been a deficiency in the supply of certain denominations of silver coin which it became necessary to make good in 1877. The Bank, it will be observed, also took the opportunity of withdrawing from circulation a large amount of worn coin.

Scotland and Ireland.

The following table, in continuation of that given in my last Report,† shows the amounts of silver coin issued by the Mint to Scotch banks and to the Bank of Ireland, and the amounts of worn coin withdrawn by them from circulation, during the years 1872 to 1877 inclusive:—

Year.	New Coin issued.		Worn Coin withdrawn from Circulation.	
	To Scotch Banks.	To Bank of Ireland.	In Scotland.	In Ireland.
	£	£	£	£
1872	180,000	Nil.	26,510	15,000
1873	154,000	2,000	73,263	Nil.
1874	Nil.	5,000	25,900	10,400
1875	67,550	50,000	11,000	Nil.
1876	Nil.	20,000	Nil.	Nil.
1877	94,000	10,000	37,280	Nil.

These figures show that during the year 1877 the Scotch banks have again extensively availed themselves of the facilities afforded by the Mint for the renewal of the silver coinage in Scotland, and that large amounts of coin have been sent to, and withdrawn from circulation in, that part of the United Kingdom. It would appear, on the other hand, that the Bank of Ireland has been unable to make arrangements with the other banking establishments in that country for a systematic issue and withdrawal of coin, which are much required. Further efforts will be made to induce the Irish banks to co-operate in effecting so desirable a reform.

Colonies.

I also append a statement of the amounts of silver coin sent to, and withdrawn from circulation in, the Colonies during the past year:

Seventh Annual Report (1876), page 5.
Do. do. page 6.

SILVER COIN TRANSMITTED TO COLONIES.

	£	s.	d.
New South Wales	50,000	0	0
West Indian Colonies	14,800	0	0
Victoria	650	0	0
South Australia	17,000	0	0
West Africa	7,025	0	0
Tasmania	5,000	0	0
	£94,475	0	0

WORN SILVER COIN WITHDRAWN FROM COLONIES.

New South Wales	£8,418	0	0

It will be seen that the issues of silver coin to the Colonies in 1877 have exceeded those of 1876, 75,375*l.*, by nearly 20,000*l.*, and that, out of a total of 94,475*l.*, 72,650*l.*, or more than three-fourths, have been sent to Australia. The withdrawals of worn coin have only amounted to 8,418*l.*, sent in to the Mint at Sydney and sold on behalf of the Imperial Government under the arrangements made in 1873.*

The average market price at which standard silver has been purchased by the Mint during the year is 4*s.* $8\frac{1}{16}$*d.* per ounce, so that, the rate at which silver coin is issued by the Mint being 5*s.* 6*d.* per ounce, the seignorage accruing to the State has been at the rate of $9\frac{15}{16}$*d.* per ounce, or $17\frac{3}{4}$ per cent. In the year 1876, as stated in my last Report,† no silver bullion was purchased for coinage, but, had such purchases been necessary, the seignorage would have been at a much higher rate than in 1875, the average price of silver during the year having been 4*s.* 5*d.* per ounce. The rate of seignorage in 1877, though not so high as that of the seignorage which would have accrued in 1876, is also higher than that of 1875. I subjoin a table showing the approximate rate at which seignorage has actually accrued in each year from 1870 to 1877 inclusive in which silver bullion has been purchased for coinage, from which it will be seen how greatly the relation between the metallic and nominal value of British silver coin has been affected by the change which has taken place of late years in the price of silver:—

Year.	Rate of seignorage.
1870	9 per cent.
1871	$9\frac{1}{4}$ „
1872	$9\frac{1}{2}$ „
1873	$12\frac{1}{4}$ „
1874	$12\frac{1}{8}$ „
1875	16 „
1876	(No silver bullion bought).
1877	$17\frac{3}{4}$ per cent.

* See Fourth Annual Report (1873), page 22.
† Seventh Annual Report (1876), page 7.

The usual Return showing the sums advanced to the Master of the Mint from the Consolidated Fund for the purchase of bullion for coinage, and the amounts repaid by the Mint to the Exchequer, during the past year, will be found in the Appendix.* The advances amounted to 500,000*l.*, and the repayments to 440,000*l.*, leaving the balance due to the Exchequer on the 31st of December last at 385,000*l.*, as against 325,000*l.* at the close of 1876. As explained in my last Report,† the balance due to the Exchequer is represented by cash in the Bank of England, and by the silver and bronze bars and coin, with a small amount of old copper coin still unused, remaining in stock.

Bronze coinage.

During the year 1877 no contract has been made for the execution of the bronze coinage, the Mint having been able itself to meet the demand, which has not been excessive. In the month of August it became necessary to purchase a fresh supply of metal, and, after tenders had been called for, a contract was entered into, as on former occasions, with Messrs. Ralph Heaton & Sons for one hundred tons of bronze bars ready for coinage.

The amount of bronze coin issued during the year was 42,050*l.*, as against 49,575*l.* in 1876. In the two preceding years the issues had been much greater, but it was to be expected that the depression of trade would affect the demand for bronze coin as well as that for gold and silver. As in 1876, the issue of pence and halfpence was suspended in the metropolitan district between August and the end of the year, owing to the accumulation of coin of those denominations in the hands of the London brewers, to whom, as on former occasions, applicants resident in the district were referred, instead of being supplied with new coin. Of the amount issued, 8,040*l.* was shipped to Colonies and for the use of Treasury Chests abroad, as against 3,710*l.* in 1876, and 9,560*l.* in 1875, the largest consignments being those of 2,850*l.* to Victoria, 1,500*l.* to New Zealand, and 1,000*l.* each to New South Wales and South Australia.

Withdrawal of old copper coin from Colonies, and completion of arrangements for the substitution of bronze for copper coin.

The amount of old copper coin withdrawn from circulation in Colonies during the year has amounted to 2,284*l.*, as against 1,979*l.* in 1876. A portion of this amount was sent home through the Melbourne Mint, their Lordships having, in the month of February, sanctioned an arrangement by which the coin could be received in exchange for bronze, or paid for at its full nominal value, by that Branch, as had been the practice at Sydney since 1868. The remainder was forwarded directly to this Department through the Agents for the respective Colonies in this country.

The measures taken for the withdrawal of old copper coin throughout the Empire were completed at the close of the year, their Lordships' order of the 18th of March 1876 having finally fixed the 31st of December 1877 as the date after which no copper coin could be received by the Mint from Colonies at its

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* Appendix, page 49.
† Seventh Annual Report (1876), page 8.

full nominal value. The first issue of the present bronze coinage took place in the United Kingdom in the year 1860, and the withdrawal of copper coin was commenced in the following year. In 1869, a Proclamation dated the 13th of May directed that copper coin should from the 31st of December in that year be no longer current, but it was still received at its full nominal value, so that no loss might be incurred by the public in returning it to the Mint. In the month of February 1873, as stated in my Report for that year,* I recommended that the practice of receiving the coin at its nominal value should be discontinued, pointing out that it had ceased for more than three years to be a legal tender in the United Kingdom, and that the amounts sent in for exchange had become insignificant; and their Lordships were pleased to direct that after the 30th of July in that year the coin should no longer be received. At that date, therefore, all transactions connected with the exchange of copper for bronze coin were finally closed so far as the United Kingdom was concerned, but in the case of the Colonies it was eventually decided, after communication with the Secretary of State, that an extension of time should be accorded, so that distant Possessions, in which no steps had as yet been taken to substitute bronze for copper coin, might have the opportunity of making the necessary arrangements for that purpose. The date up to which the coin was to be received at the Mint was first fixed as the 30th of June 1876; but, after further correspondence between the Treasury and the Colonial Office, it was thought desirable that an Order in Council should be passed, by which the Proclamation of May 1869 above mentioned, declaring the coin to be no longer current in the United Kingdom, should be formally extended to the Colonies. An Order was passed accordingly on the 24th of March 1876, and, as already stated, the 31st of December 1877 was fixed as the limit of time for the reception of the coin by this Department.

It may be interesting to note how far the amount of copper coin withdrawn during the whole period from 1860 to the close of 1877 corresponds with the amount believed to have been in circulation, and what have been the issues of bronze coin during the same period as compared with the amount of copper coin presumed to have been current before 1860.

It is difficult to determine, from the records of the Mint, or from other sources, what was the amount of copper coin of different issues actually in circulation when its withdrawal was determined upon. The copper coin passing current in Great Britain was ascertained, by samples taken from circulation by the Mint at the beginning of 1857, to consist of coins issued between 1797 and 1856, in the following proportions:—

Coins dated	1797 to 1805,	21·5 per cent.
„ „	1806 to 1852,	62·3 „
„ „	1853 to 1856,	14·8 „
and of counterfeits, tokens, &c.,		1·4 „

* Fourth Annual Report (1873), page 10.

This result showed that coins of dates anterior to 1797 had disappeared from circulation, but it is also well known that coins of subsequent issues, and notably the pence of 1797, which were very heavy, were melted down in large quantities at times when an advance in the price of copper raised their intrinsic above their nominal value, and their sale as metal became a profitable transaction. The total amount of copper money issued between 1797 and 1859 was 1,236,736*l.*; but, looking to the fact proved by the above-mentioned inquiry, that the coinages issued before 1806 formed only 21·5 per cent. of the coin current in this country, I am induced to think that at the time of the inquiry the earlier and heavier coinages, executed under contract with Mr. Boulton at Soho, cannot have formed more than 30 per cent. of the coin in circulation in the United Kingdom and the Colonies, and that the amount to be withdrawn might have been reckoned at about 580,000*l.* The amount actually withdrawn has been 580,360*l.*, and the above estimate, therefore, has been substantially realised. From inquiries which have been made this year it appears certain that there is now little or no old copper coin in circulation in the United Kingdom, while the reports sent in to the Colonial Office show that the amount still circulating in the Colonies is believed to be very small. The total amount withdrawn from Colonies has only been 44,000*l.*, of which 32,000*l.* was from Ceylon, and it is possible that there may still be a certain quantity of the old coin in distant Settlements. In some Colonies, too, as for instance the Cape of Good Hope and New Zealand, but little appears to have been done to encourage the withdrawal of the old coin from circulation, but, whatever be the amount in existence, it is probably insignificant, and the very large sum of 656,376*l.*, which represents the difference between the amount originally issued and that eventually withdrawn, remains unaccounted for. The greater part of this deficiency is, no doubt, due to the fact that, as above mentioned, a large proportion of the old heavy coins were melted down for sale as metal, but it may be concluded that the amounts lost at sea, and otherwise hidden or destroyed, have also been very great. It is not unreasonable to assume that in the withdrawal of a large coinage, especially if the pieces possess but little intrinsic value, the discrepancy between the amount originally coined and the amount eventually withdrawn will always be considerable. In France the amount of old copper coin in circulation was estimated at 49,600,000 francs, while the amount actually withdrawn, on the introduction of the bronze coinage, was only 48,500,000 francs, leaving a deficit of 1,100,000 francs, or about 44,000*l.** In France, indeed, the amount of old coin to be withdrawn was even larger than the amount originally issued for circulation in the United Kingdom and its Dependencies, but it must be borne in mind that there was no reason to believe that any considerable proportion of the French copper coin had ever been melted down, and that, on the other hand, in the case of

* See "Notes sur l'émission en France des monnaies décimales de bronze," by M. E. Dumas, (Paris, 1868).

England the great extent of the Empire makes it far more likely that large quantities of coin would disappear or be destroyed.

The usual Return, given in the Appendix,* shows that the amount of bronze coin issued from 1860 to the 31st of December 1877 has been 1,367,963*l.*, of which about 60,000*l.* has been sent to the Colonies. From these figures it would appear that the amount of bronze coin in circulation is considerably more than double that of the copper coinage which it replaced.

The total weight of bronze pence, halfpence, and farthings issued has been as follows:

	Tons.
Pence - - -	2,003
Halfpence - - -	1,072
Farthings - -	188
	3,263

Of this amount 1,720 tons were coined by Messrs. James Watt and Co. at Soho, 335 tons by Messrs. Ralph Heaton and Sons, of Birmingham, and 1,208 tons by the Mint.

The profit which has accrued to the Exchequer on the bronze coinage, since its first introduction, after deducting the amount paid for the bronze metal used and for the old copper coin withdrawn from circulation, has been 690,307*l.*

Colonial coinages.

Only two Colonial coinages have been executed by the Mint during the year, namely, a silver coinage for the Straits Settlements, in pieces of twenty, ten, and five cents, of the nominal value of 30,000 dollars, and a bronze coinage of cents for Hong Kong, of the nominal value of 20,000 dollars. Besides these, however, the following coinages were executed by Messrs R. Heaton and Sons, of Birmingham, under the superintendence of this Department; namely, a new coinage of bronze pence, halfpence, and farthings, for the States of Jersey; new subsidiary coinages of ten and twenty cent pieces in silver, and five, two, and one cent pieces in bronze, for Mauritius; and a silver coinage, of the nominal value of 48,000 dollars, in pieces of twenty, ten, and five cents, for Hong Kong. Full particulars with reference to the design, weight, and fineness of the two first-named coinages are given in my Report for 1876,† all the preliminary arrangements in connection with them having been made in the course of that year.

Proposal for the coinage of a British dollar for the Straits Settlements and Hong Kong.

In 1874, as shown in my Report for that year,‡ a despatch from the Governor of Hong Kong was referred to me by their Lordships' directions, calling attention, at the instance of the Hong Kong Chamber of Commerce, to the condition of the currency of that Colony. Several proposals were made in the Chamber for obviating the inconvenience to which the mercantile community of Hong Kong is exposed in consequence of its dependence upon

* Appendix, page 53.
† Seventh Annual Report (1876), pages 10 and 11.
‡ Fifth Annual Report (1874), page 9.

the Mexican dollar as the standard coin of the Colony; and a resolution was passed requesting the Governor to endeavour to make arrangements with the Mint in this country for the coinage of a British dollar to meet the wants of Hong Kong and the adjacent ports.

In reporting on the proposals made, I pointed out the difficulties which appeared to stand in the way of establishing a separate coinage for a Settlement in the peculiar position of Hong Kong, showing that a dollar could not be coined in England for less than two per cent. of its value, and that no person would be willing to pay such a charge if he could obtain an equivalent coin on more favourable terms. I further observed that the correspondence which passed between the Governor and the Home Government at the time of the abandonment of the Hong Kong Mint in 1868 showed that the expense of maintaining such an establishment was a burden far too heavy for the Colony to bear; and I added that, as the experiment of a Mint at Hong Kong had been a complete failure so far as its financial results were concerned, so it might be feared that any other scheme for obtaining a British dollar, without more expense than now attends the purchase of Mexican dollars in the market, would equally prove financially unsuccessful.

In March 1877 their Lordships were pleased to refer to me a despatch from the Governor of the Straits Settlements, with other despatches and papers, in which the question of the coinage of a British dollar for circulation in China was again raised. I need not in this place set forth in detail the arguments used by Sir William Jervois to prove that a British dollar could be coined at a profit, nor the considerations submitted to their Lordships on this and other points in my Report of the 20th of April. It will be sufficient to say that the despatch entered into a calculation in which it was assumed that the charge imposed on the manufacture of a dollar would be $\frac{1}{2}d.$ per ounce, or nearly one per cent., which would be nearly double that of the American Mints. In reference to this assumption, I repeated the statement made in my Report to the Treasury of the 28th of November 1874 above referred to, that the charge for coining a dollar could not be reckoned at less than two per cent., observing that this was the charge fixed for the coinage of dollars at the Hong Kong Mint in 1865, and is the charge at the Indian Mints. I further explained that since the date of my former Report I had been informed by the Director of the United States Mint that the charge for coining trade dollars had been raised to one and a half per cent. at the Mints at San Francisco and Carson, and to one and a quarter per cent. at the Mint at Philadelphia, which rates were estimated to cover only the actual cost of coining. With regard to the difficulty at times experienced of obtaining dollars in China, to which Sir William Jervois called attention, I reported that, taking the year as a whole, there is generally a plentiful supply of Mexican dollars in the London market, but that, in the absence of purchasers for the East, large amounts are sold to refiners and melted, whereas, if the Banks purchased such parcels at a fraction above their

refining value, they would be prepared each year for the "China season," and would be secured against paying the heavy premium on dollars to which the demand at that season gives rise.

I append*, as usual, a Return showing the coinage executed by the Mint during the last ten years, and other Returns and Accounts as given in former Reports. Coinage Returns.

The General Account† of the transactions of the Department during the year 1877 shows that, after the payment of all expenses, including those incurred on behalf of the Mint by other Departments and the non-effective charge, there remained a net profit on the operations of the year of 32,041*l.* In 1876, as shown in my Report for that year,‡ the compulsory suspension of the coinage for nearly five months caused a deficit of 27,719*l.*, while in 1875, owing to the large amounts of the silver and bronze coinages, there was a profit of 75,802*l.*, as against 26,435*l.* in 1874, and 40,564*l.* in 1873. The receipts of the Mint, as will be seen by the Account, consist almost entirely of the profits which accrue on the silver and bronze coinages; and it is satisfactory to find that even in times when, as in 1877, the demand for coin is below the average, and the opportunity is taken to withdraw large amounts of worn silver coin from circulation at the expense of the State, the operations of the Department result in a net profit of considerable amount.

The sum voted for the expenses of the Mint for the year 1877–78, 50,200*l.*, has been found insufficient, owing to the large amount payable to the Bank of England on account of waste on a gold coinage of 8,600,000*l.* which had been in progress since November 1874, and will probably be completed during the current year, and also in consequence of the expense incurred in connection with the withdrawal of worn silver coin from circulation during the financial year, which has proved larger than was anticipated. It became necessary, therefore, to submit to Parliament a Supplementary Vote for 4,000*l.*, to be accounted for under the Sub-heads "Loss on Coinage, Gold," and "Loss on worn silver coin withdrawn from circulation." Details respecting the waste on the gold coinage will be given in a future Report; but as regards the loss on worn silver coin I should mention that the excess of expenditure over the sum originally voted under this sub-head, 25,000*l.*, only amounted to 1,345*l.*, and is easily accounted for by the fact that in a time of commercial depression the coin finds its way back more readily to the banks and consequently to the Mint for re-coinage. Estimates.

The Estimate for 1878–79, 51,035*l.*, shows an increase of 835*l.* over the original Vote for the previous year, which is due in part to the ordinary increments accruing in Salaries, and partly to the necessity of providing for larger payments to the Artificers on account of "over-time," more labour and more con-

* Appendix, page 50.
† Appendix, page 46.
‡ Seventh Annual Report (1876), page 12.

stant attention being each year required to prevent the machinery of the Mint from becoming useless. I should also mention that, since the Estimate was submitted to their Lordships, an intimation has been received from the Commissioners of Police to the effect that, owing to the necessity of providing for the cost of supplying substitutes during the absence of constables on account of sickness or on ordinary leave, the charge for the Police specially employed on duty at the Mint would be increased from the 1st of April 1878 by about 80*l.* a year. The estimate under this sub-head, therefore, will for the future be 780*l.*

Mint Office.

The nominal value of the specie packed for the use of Treasury Chests abroad during the year 1877 has been 503,649*l.*, as against 234,129*l.* in the preceding year. The shipments made consisted of 322,700*l.* in British gold coin, 28,140*l.* in British silver, 150*l.* in bronze, and 152,659*l.* in Mexican dollars for China and the Straits Settlements. The value of the dollars shipped in 1876 was only 38,089*l.*, but the consignments of the two previous years were much larger, having amounted to 209,757*l.* in 1875, and 316,541*l.* in 1874.

Mint Museum.

During the year 1877 several instances of "Treasure Trove" have been reported to their Lordships from different parts of England, and the coins found, after inspection at the British Museum, have been forwarded, as on previous occasions, to this Department for a report as to their metallic value. As some of them possessed considerable numismatic interest, and specimens were not to be found in the Museum of the Mint, I requested their Lordships' permission to buy them at the value placed upon them by the Keeper of Coins and Medals at the British Museum, and to add them to the Collection belonging to the Department, which was re-arranged and opened for the inspection of the public in 1873.* The coins selected consisted of forty-five silver pence of William the Conqueror, found at Tamworth; three gold nobles, of Edward III., Richard II., and Philip III. Duke of Burgundy, from Chalcot in Wiltshire; and three gold crowns of Henry VIII., found at Bisham Abbey.

Visitors.

The number of visitors to the Mint during the year has been very large, the orders of admission having been 1,848, and the persons admitted 7,409. In 1876, owing to the long suspension of the coinage, the admissions were much fewer.

Operative Department.

The Memorandum of the Superintendent of the Operative Department for the year will be found, as usual, in the Appendix.†

At the conclusion of my last Report‡ I ventured to express a hope that the break-down which took place in 1876 might, by affording an opportunity of strengthening those parts of the

* Fourth Annual Report (1873), page 14.
† Appendix, page 36.
‡ Seventh Annual Report, page 32.

machinery which are most likely to fail, prove the means, so far at least as the immediate future was concerned, of averting the recurrence of accidents which would seriously interrupt the operations of the coinage. I am glad to report that, as regards the year 1877, that hope has been realised. The machinery of the Mint requires unremitting attention, and must always, in view of its present condition and arrangement, be a source of great anxiety to those responsible for its working; but though the resources of the Department, as their Lordships are aware, are unequal to meet the calls made upon it, there are no special grounds for apprehending a further interruption of its work.

The demand for coin having been moderate, the work of the Operative Department has not been excessive, nor have any important changes been made during the year in the details of minting. One improvement, however, described by Mr. Hill, will be of some interest to persons engaged in Mint operations, namely, the substitution of plumbago pans for the copper tubes hitherto used for annealing "blanks," by which a considerable saving has been effected; and it may be noted with satisfaction that, after many trials, steel has been found well suited for the manufacture of dies. Great difficulties have of late years been experienced by this and other Mints in procuring steel of good quality for dies, but it may now be hoped that, the attention of manufacturers having been specially called to the subject, those difficulties may be in a great measure overcome.

I had occasion during the year to request authority to comply with two applications, made to the Secretaries of State for the Colonies and for Foreign Affairs respectively, for grants of coins and medals. The President of the Public Library at Melbourne, Victoria, applied for the grant of certain medals and Maundy monies for the Museum of that institution; and the Director of the French Mint requested that a set of British Colonial coins required to complete its collection might be presented to the Museum attached to the Mint in Paris. To both these requests their Lordships permitted me to return favourable answers, and grateful acknowledgments have been received of the gifts.

Scientific arrangements.

I append,* as usual, the Memorandum of the Chemist of the Mint for the year, which shows that, as the amount of routine work in his Department has not been excessive, scientific researches have been actively conducted.

The coins sent from the Sydney and Melbourne Mints have, as heretofore, been assayed in this Department, and the results show that the uniform accuracy of these coins both as to weight and fineness, has been well maintained. Equally satisfactory proofs of the skill and care bestowed on the details of coinage have been afforded by the assay-pieces of gold and silver which have been forwarded by the Japanese Government from the Mint at Osaka.

* Appendix, page 40.

During the past year, steps have been taken towards the formation of a scientific library. The Mint already possesses a library, bequeathed for the most part by the late Sir Joseph Banks, which is rich in treatises on numismatics and currency. It contains, however, but few scientific books, and much time has hitherto been wasted in visits to the libraries of learned Societies or to certain Institutions, whenever it has been necessary to consult standard works of reference or current scientific literature. I therefore requested the Comptroller of Stationery to furnish this Department with certain Standard works, and with such periodicals as the "Comptes Rendus" of the French Academy of Sciences, as well as with certain of the chemical and physical journals published in this country, in France, and in Germany.

The verdict of the jury at the trial of the Pyx for the year 1877, which was held at Goldsmiths' Hall on the 4th of July, is appended to this Report.* The value of the gold coinage submitted for examination was only 630,800*l.*, and that of the silver coinage 526,800*l.* Six gold and four silver coins were examined, and the results were, as usual, satisfactory; but it is needless to point out that, in order to ascertain with real accuracy the standard of a coinage, it would be necessary that the examination should extend to a far larger number of coins than it has hitherto been the practice to take for assay. I may mention that during the progress of a gold coinage in the Mint the fineness of the coins is now graphically represented by the system of rectangular co-ordinates. The curve thus produced forms a continuous record of the daily results of the Mint assays, and the exact standard of the coinage therefore can at once be seen.

During the year 1877 there has been no opportunity of completing either a gold or silver coinage, so as to determine the actual loss to the Mint in its execution. Since the 31st of March last, however, the waste on the silver coinage of 1,406,197*l.* executed between the 1st of January 1875 and that date has been ascertained to be 586*l.* 3*s.* 8*d.*, or 416*l.* 17*s.* 1*d.* per million. The amount realised by the sale of "sweep" was 440*l.* 12*s.* 5*d.*, so that the actual loss has been 145*l.* 11*s.* 3*d.*, or 103*l.* 10*s.* 3*d.* per million. The loss on the previous silver coinage of 3,881,988*l.*, brought to a conclusion on the 31st of December 1874, was at the rate of 336*l.* per million, and the result of the coinage last completed, therefore, may be considered highly satisfactory. At the date of this Report a gold coinage is in process of completion, and it may be hoped that an adjustment of accounts between the Mint and the Bank of England may offer the opportunity of ascertaining the net loss on a coinage of about 8,600,000*l.* which will have been executed since October 1875.

In my Report for 1876† full details were given of experiments which were made with a view to ascertain whether a relation

* Appendix, page 53.
† Seventh Annual Report (1876), page 15.

could be established between the composition of gold-copper alloys and their densities. The results show that it would be possible to arrange a method by which the composition of a mass of coins could be verified without destroying their integrity. These experiments have been continued, mainly in the hope of setting at rest questions as to the effect of compression and annealing on the density of gold, and some physical constants which had long been wanting have been supplied.

New process for producing dies.

In the month of September my attention was directed to what was represented to be a new process for producing dies. The process was stated to differ essentially from that now employed, and, as it had been acquired by several foreign Governments, I obtained their Lordships' permission to visit, with the Chemist of the Mint, certain European Mints in which experiments with a view to its permanent adoption were in progress.

The main reason urged for its acquisition by this country was that dies could by its aid be produced more rapidly, and would be more durable, than those now in use. The sum demanded by the inventor was, however, largely in excess of that which I ascertained to have been paid for it by other Governments, and, as pointed out by Mr. Roberts in a report on the subject, it is not at present possible in this Mint to estimate the value of the process on the basis of increased durability of dies, because it is uncertain to what extent the molecular structure of the dies now in use is impaired by the ponderous presses still retained here. Another instance, it may be remarked, is thus afforded of the way in which progress is arrested by the obsolete machinery of the Department. It also appeared that, although the details of the process are secret, the principles upon which it is based are well known, and were practised by die-sinkers in the last century.

As under these circumstances I was not in a position to ascertain the probable value of the secret, I was unable to recommend that a large sum should be expended in acquiring it. If, however, the process should be permanently adopted by Continental Mints, the results will be communicated to me, and it may become my duty to make a further recommendation to their Lordships on the subject.

Price of silver.

I have already shown* how large has been the rate of profit on the silver coinage during the past year, owing to the very low price at which bar silver has been purchased. The average price of standard silver per ounce in the London market for every month in the year is given in the following table:

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* Page 7.

Month. (1877.)	Average price per ounce of standard silver in the London market.
	d.
January	$57\frac{9}{16}$
February	$56\frac{3}{4}$
March	$54\frac{3}{4}$
April	$54\frac{1}{8}$
May	$54\frac{3}{16}$
June	$53\frac{11}{16}$
July	$54\frac{1}{16}$
August	$54\frac{3}{16}$
September	$54\frac{7}{16}$
October	$55\frac{1}{16}$
November	$54\frac{1}{2}$
December	54

It will be seen that the average price during the year was $54\frac{3}{4}d.$, as against $53d.$ in 1876, and that there were no signs of unsteadiness in the market such as were shown in the latter year, when the price ranged from a maximum of $56\frac{1}{2}d.$ to a minimum of $48\frac{5}{8}d.$* Messrs. Mocatta and Goldsmid, the Bullion-brokers of the Mint, in their circular for 1877, state that the highest price obtained during the year was in January, when $58\frac{1}{4}d.$ was temporarily obtained, in consequence of the active demand for India, but that a gradual though interrupted decline followed, and continued till June, when the lowest point, $53\frac{1}{2}d.$, was reached. During the next three months the price ruled about $54d.$, and, after a rapid rise caused by further orders from India, when $55\frac{5}{8}d.$ was reached, returned to about $54d.$, which was the approximate price at the close of the year. The circular adds that, out of twenty millions of silver imported during the year, twelve millions were received from Germany, and only two millions from America, and that the remaining stock in Germany, therefore, becomes a matter of serious interest, not, as a few years ago, from any fear of its further depreciating the value of silver, but rather with reference to the probability that future supplies may be obtained thence in the event of any extraordinary demand.

Since the beginning of 1878 the price has been :—

Month.	Average price.
	d.
January	$53\frac{3}{4}$
February	$54\frac{3}{8}$
March	$54\frac{3}{8}$
April	$54\frac{1}{16}$

showing no appreciable variation from that which ruled during the last two months of 1877.

I may mention that during the session of 1877 further papers presented to Parliament† with reference to the Silver Question,

* See Seventh Annual Report (1876), page 19.

† Return, East India (Silver) No. 120, (Session 1877).

in continuation of those laid before the Select Committee of the House of Commons on the depreciation of silver in 1876, contain much valuable information as to the coinage of foreign countries.

Sydney Mint.

I append the Annual Report of the Deputy Master of the Sydney Mint for the year 1877*, in which will be found details as to the business of that Branch of the Mint during the year.

On the 31st of December last Mr. Charles Elouis, who had held the Deputy Mastership at Sydney since the 3rd of July 1868, resigned that appointment, and their Lordships were pleased to award him from that date the retired allowance to which he had become entitled after a service of more than forty-two years. Mr. Elouis, then Registrar and Accountant in this Department, was appointed Superintendent of the Bullion Office at Sydney in the year 1854, and succeeded to the Deputy Mastership on the transfer of Colonel Ward, R.E., to Melbourne. In submitting to their Lordships his claim for superannuation, the Master of the Mint reported that during the whole period of his service Mr. Elouis had discharged his duties with marked advantage to the Department; and he further desired me to intimate to Mr. Elouis the high sense which he entertained of the care and judgment uniformly displayed by him while holding his responsible office. By their Lordships' directions a part of the pension granted to Mr. Elouis, being awarded in respect of his service in the Mint in this country, was made payable from the Vote for Superannuations annually submitted to Parliament, while the remainder was charged upon the annuity granted by the Colonial Legislature for the maintenance of the Mint in New South Wales, the amount of the two portions being calculated upon his length of service at home and in the Colony respectively.

The Queen was pleased, by Warrant under Her Majesty's Royal Sign Manual dated the 8th of November last, to appoint Mr. Robert Hunt to the Deputy Mastership of the Sydney Mint in Mr. Elouis's room. Mr. Hunt was appointed First Clerk of the Bullion Office at Sydney, when a branch of the Mint was first established there in 1853, and in 1869, on the establishment of the Melbourne Mint, was transferred to the appointment of Superintendent of the Bullion Office there.

It will be seen from Mr. Elouis's Report that the amount of gold sent in to the Sydney Mint for coinage in 1877, 1,608,248*l.*, was almost identical with the amount received in 1876, and that the largest part was again contributed by Queensland. The value of the gold coined during the year, which consisted exclusively of sovereigns, was 1,590,000*l.*, as against 1,613,000*l.* in sovereigns and 30,000*l.* in half-sovereigns in 1876, and, under regulations first laid down in 1875,† a sum of 10,086*l.* in light gold coin has been withdrawn from circulation and re-coined free of charge. The renewal of the silver coinage in New South Wales and neighbouring Colonies has made good progress during the year, and, combined with the arrangements for the exchange

* Appendix, page 54.

† See Sixth Annual Report (1875), pages 16 and 45.

of old copper for bronze coin, now completed, has placed the token circulation in a satisfactory condition. It will be seen, therefore, that full advantage has been taken of their Lordships' permission to the Sydney Mint to act as a medium for the issue of the silver and bronze coinages and the withdrawal of the old coin.

During the past year a slight modification has been made in the general regulations laid down in the Order in Council of the 19th of August 1853, by which the Sydney Mint was established. That Order contained a clause directing that the Governor of New South Wales should obtain, once every month, from the general circulation, two pieces in good condition of each description of coin issued from the Mint, and should cause the same to be transmitted to England, in order that they might be subjected to the same examination as pieces taken directly from the Sydney Mint. In a report of the 3rd of August last, Mr. Elouis proposed, with the sanction of the Governor and the concurrence of the Colonial Treasurer, that this arrangement should be discontinued. [illegible] official statement to Sir Hercules Robinson of the reasons [illegible]ich induced him to make this recommendation pointed out that [illegible]esult of the examination of these pieces, annually laid before [illegible]Colonial Parliament, was calculated to convey an erroneous impression as to the work of the Mint, owing to the fact that a certain number of the pieces taken from circulation have usually been found to be below the weight at which they could legally have been issued from the Mint, while on the other hand the periodical reports of the Master of the Mint on the pieces taken by the Colonial Treasurer before the delivery of the coin, which are also laid before Parliament, afforded an authentic record of the character of the Sydney coinage. In recommending that their Lordships should be pleased to give effect to Mr. Elouis's suggestion, I reported that the arrangement for sending home "Governor's pieces" appeared to have been originally made with the view of providing an additional safeguard against the circulation of spurious coins in the Australian Colonies, but that it was not considered necessary to include any such regulation in the Order in Council establishing the Melbourne Mint, and that the examination in this Department of the pieces sent home quarterly by the Sydney and Melbourne Mints, on which a report is submitted periodically to their Lordships, would seem to be a sufficient guarantee of the general integrity of the coinage issued by those Branches. I proposed, therefore, that their Lordships should be pleased to take the necessary steps for obtaining the issue of an Order in Council repealing the clause of the Order of August 1853 above quoted, and in accordance with this recommendation an Order in Council was passed on the 23rd of November last, amending the Order of 1853 by omitting the clause in question.

Melbourne Mint.

The Annual Report of the Acting Deputy Master of the Melbourne Branch of the Mint will be found in the Appendix.*

* Appendix, page 57.

Colonel Edward W. Ward, R.E., who was appointed Deputy Master at Melbourne on the 23rd of March 1867, found himself compelled, in the course of the year 1876, to ask for twelve months' leave of absence on account of ill-health, and, with their Lordships' permission, left Melbourne on the 11th of June. In March 1877 he applied for an extension of leave, in the hope that he might be able to return to Victoria in the following September, but the state of his health rendered it impossible for him to avail himself of the further leave for six months granted to him, and on the 19th of July he placed his resignation in the hands of the Master of the Mint. In transmitting to the Treasury the particulars of Colonel Ward's claim for superannuation, I was directed to submit to their Lordships a statement of the services which he had rendered to the Department in the establishment of branches of the Mint at Sydney in 1853 and at Melbourne in 1867, and to point out that he had been in both cases charged not only with the preliminary arrangements in this country, under the directions of the Master of the Mint, but with the arduous and difficult duties [redacted] tailed by the organisation of new Departments, and erection of delicate machinery, in countries where such an blishment as a Mint must depend upon itself alone for sk labour, and no new appliances can be purchased. I was further directed to state that under Colonel Ward's superintendence both Branches of the Mint had attained a high degree of efficiency, and that the Master of the Mint had uniformly had reason to recognise both the tact with which the relations of these Imperial establishments with the Colonial Governments had been maintained, and the ability with which the more technical part of the Deputy Master's duties had been performed. Their Lordships were pleased to grant to Colonel Ward an allowance amounting, with the military full-pay to which he became entitled on his retirement as Major-General, to two-thirds of the salary and emoluments of his late civil employment, and to make it chargeable to the Sydney and Melbourne Mint annuities, in respect of his services in those Branches of the Mint. On receipt of this award, the Master of the Mint caused a minute to be drawn up, expressive of his regret at the necessity for Colonel Ward's retirement, and recording the signal ability and success with which his duties had been discharged. A copy of this minute was communicated to Colonel Ward with the order granting his pension.

In the room of General Ward, Mr. Vernon Delves Broughton, First Class Clerk in the Treasury, was selected for the Deputy Mastership at Melbourne. The Royal Warrant for his appointment is dated the 8th of November 1877, and he has entered upon his duties.

Mr. Hunt's Report shows that the coinage of the year at the Melbourne Mint, rather more than 1,500,000*l.*, was less by nearly 600,000*l.* than that of 1876, notwithstanding that the amount of coin exported from Victoria was unusually large. It also describes the steps taken, under their Lordships' authority, for

the issue of bronze and the withdrawal of old copper coin in the Colony through the medium of the Melbourne Mint. The consignment of old coin referred to as having been shipped to London arrived in this country before the close of the year, and was received at the Mint and paid for at its full nominal value, in accordance with the regulations. Attached to the Report is a paper by Mr. G. Foord, one of the Assayers of the Mint, which contains details as to the working of an adaptation of the well-known system of double weighing which he has introduced into the Assay Department at Melbourne.

Design as applied to coinage.

The question of the general design of coins is far more complicated than that of portraiture, which was treated at some length in my last Report.* To deal with it satisfactorily would require a closer examination of artistic detail than could be entered upon in a Report of this nature; but the subject is of so much interest and importance, that I propose briefly to set forth such facts in connection with it as will serve to show the phases through which decorative art as applied to coinage has passed in ancient and modern times.

It is well known that the impressions on the reverse of very early coins were produced by the rough surface of the anvil, or by the nail-head, on which they were placed while the obverse was struck with the coining-tool or die.† Subsequently, indentations were formed by points of metal arranged in a geometrical form, and these eventually gave place to designs from engraved dies. So far as this country is concerned, it may be well to dismiss the consideration of the more primitive forms by a reference to the gradual evolution of design on early British coins from antecedent types. Mr. John Evans, F.R.S., has shown‡ that the prototype of the British series is the gold "stater" of Philip of Macedon, a perfectly finished Greek coin, which was so crudely imitated by successive native copyists that ultimately the wreath round the head of the monarch alone survived, and was sometimes arranged, as shown in the annexed wood-cuts, in the form of a cross.

Coin of Philip of Macedon.

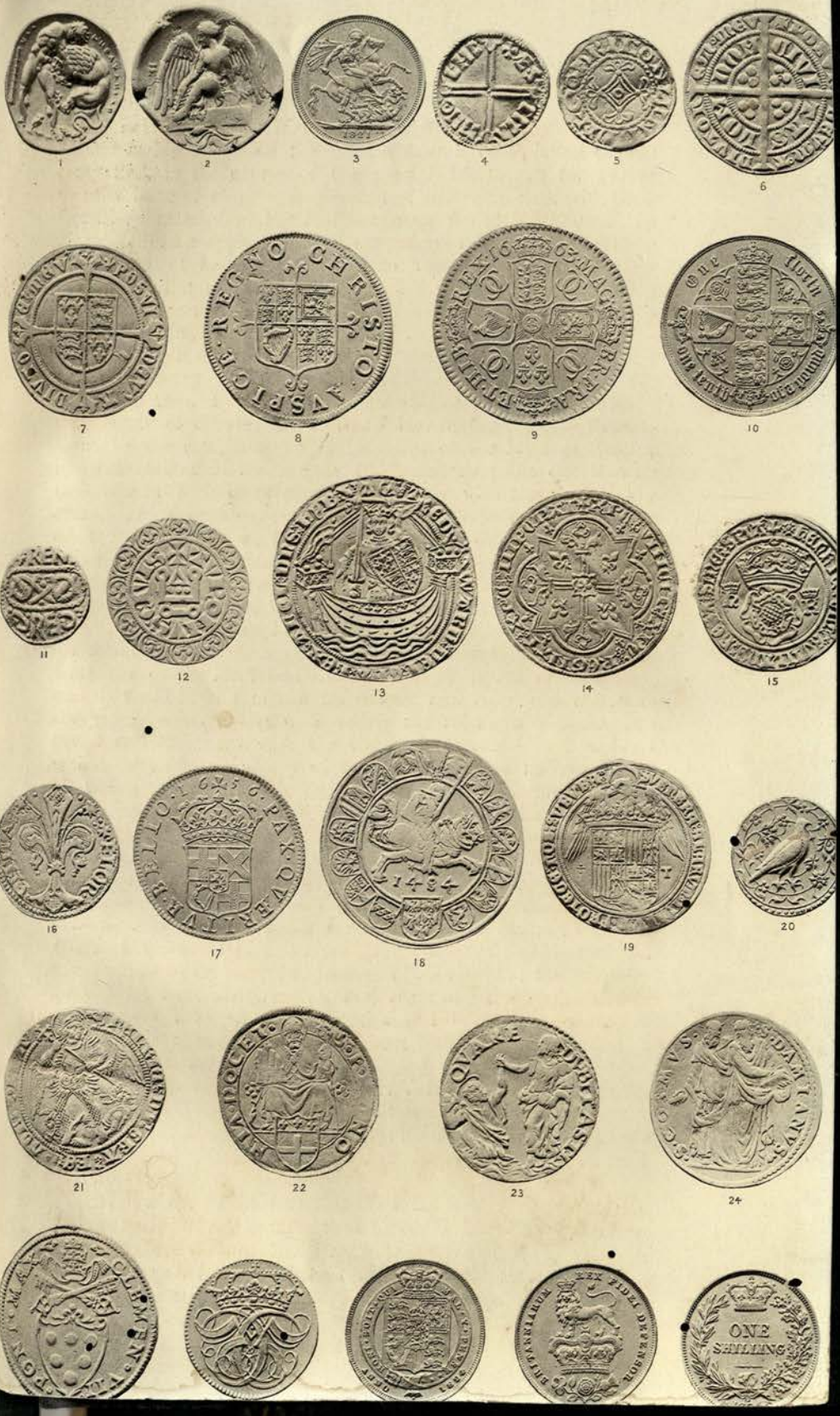
Coins of the Ancient Britons.

The fact that the art of die-sinking was practised by but comparatively few individuals has led to persistence in traditional designs, and coins have not, therefore, always been faithful ex-

* Seventh Annual Report (1876), page 19.

† See "Archäologie der Kunst, by K.O. Müller," translated by J. Leitch (London, 1847), par. 98.

‡ "The Coins of the Ancient Britons," (1864), page 23.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ponents of contemporary art. In other words, changes of design have at times been less rapid and distinct in the case of coins than in the case of architecture and painting. It may be convenient, however, to consider numismatic art under the familiar divisions of Classical, Gothic, Renaissance, and Modern.

Classical.

A superficial acquaintance with Greek coins is sufficient to show that their treatment is sculpturesque. They have, in fact, been taken by Mr. Poole, Keeper of Coins and Medals at the British Museum,* and by Mr. Ruskin,† to illustrate whole phases of Greek art, particularly sculpture; and Mr. Poole has shown with great clearness what are the different schools into which Greek art as applied to coins may be subdivided, and what are the distinctive characteristics of each. Mr. Ruskin divides the nine centuries of Greek art before the Christian era into three groups of three centuries each, which he calls the archaic, the best, and the corrupt, and gives as an example of the best period a head of Hermes, the treatment of which is marked by "extreme simplicity, "unpretending vigour of work, which claims no admiration "either for minuteness or dexterity, and suggests no idea of "effort at all." I have chosen the coin figured No. 1 in the plate, which represents the struggle of Hercules with the Nemean lion, because, as Mr. Ruskin points out, it is very characteristic of Greek work. In it, he says, there is not the "slightest "effort to represent the agony of contest, ... the whole "interest being in the beauty or rightness of form, ... "as a Greek never expresses momentary passion." No. 2 in the plate is a coin of Elis bearing a figure of Victory, from which was taken the design for the Waterloo medal. Side by side with these is placed (No. 3) the well-known design of St. George and the Dragon, by Pistrucci, in order to show how purely classical the works of this great artist were.

The influence of classical art on the British coinage is most evident in the early British series; in the modern copper and bronze coinages, the reverse of which was probably designed from a Roman medallion of Commodus, too large to be shown in the plate; and in the works of Pistrucci, of which a specimen has been given.

Gothic.

From Saxon times to the present day certain coins have borne a design the gradual development of which it is interesting to trace. No. 4 in the plate, a penny of Ethelred II., bears a grooved cross along which the coin could be divided into four parts. The reverse of the penny of William I., (No. 5), is a simple cross, surrounded by rough lettering. In No. 6, the groat of Edward III., the angles formed by the cross, which extends to the edge of the coin, are filled with pellets. In No. 7, the shilling of Henry VII., the pellets are replaced by the arms of England and France arranged quarterly. In No. 8, the shilling of Charles II., the arms occupy nearly the whole field,

* "Numismatic Chronicle," (1864), page 286.
† "Aratra Pentelici," (1872), page 111.

and almost obliterate the cross. In No. 9, the half-crown of Charles II., the quarterings of the arms are themselves arranged in the shape of a cross, alternately with the Royal Cipher, and in the florin of the present reign (No. 10) this arrangement of the arms still survives.

The British series embodies other types, well represented by Nos. 13 and 21, which are eminently Gothic in treatment. The "noble" bears the image of the ship, and, as Ruding says,* "was thus remarkably distinguished from every other coin at "that time existing." The "angel" of Henry VII. bears the design of St. Michael contending with the dragon, and is one of the numerous instances in which figures of saints are found on Gothic coins.

Viewed as a whole, the Gothic series of British coins presents many points of interest, and perhaps the most important conclusion to which a study of them leads is the imperfect way in which they represent Gothic art at the periods at which they were struck. For instance, the groat of Edward III., No. 6 in the plate, though simply and effectively designed, shows none of the rich treatment which marks the great seal of that king; and the delicate tracery and ornament which abound in the illuminated MSS., the architectural details, and the stained glass, of the period find but imperfect equivalents on the coins. This is the more remarkable, as the privilege of striking coins was exercised in a great measure by ecclesiastics, under whom art flourished, and who may be presumed therefore to have had at their command the materials for making the best possible designs. Occasionally, it is true, characteristic details may be recognised which there is no difficulty in referring to a distinct phase of Gothic treatment. Such, for instance, are the canopies and furniture of the thrones, and the device on the crown of Henry VIII. (No. 15 in the plate), which is frequently used in decorative work of the sixteenth century. The heraldic treatment of many of the coins of Elizabeth, also, offer distinct examples of the ornament characteristic of her reign; and a remarkable instance of the interlaced pattern peculiar to the Saxon and Irish art of the eighth and ninth centuries is to be found in some of the coins of Offa,† one of which is given (No. 11) in the plate. But it must nevertheless be admitted that the designs of the whole series, though often beautiful, do not, so far as this country is concerned, adequately represent contemporary art. The reason would appear to be that very many of the coins were copied directly from French examples, and that types survived to a later date. Thus, to select but a few cases, the reverse of the "masse" of Philippe le Hardi survived almost unchanged in that of the "mouton d'or" of Edward III. (No. 14 in the plate), which was in circulation a hundred years afterwards;

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* "Annals of the Coinage," vol. I, page 219.

† See an interesting paper on "Art on the Coins of Offa," by C. F. Keary, M.A. (Numismatic Chronicle, New Series, vol XV., page 206.)

and the "gros Tournois" of Philip le Bel,* No. 12 in the plate, survives in the "gros" of Henry IV. of England,† who reigned more than a century later. In the florin, struck in 1850, No. 10 in the plate, the ancient arrangement of the Royal coat of arms is retained, while the general effect of the design at once suggests the phase of Gothic ornament which was in fashion at the time.

Heraldic devices, as might be expected, offer abundant scope for treatment as designs for reverses of coins. In a coin of Frederick William, Elector of Brandenburg in 1640, a shield, with supporters, bearing twenty-six quarterings and nine crested helmets, is introduced. Of the examples given, No. 19 is a fine but simple treatment of the arms of Ferdinand and Isabella of Spain. No. 18, a coin of Sigismund of Austria, bears, as is often the case, an equestrian figure. No. 25 shows how the arms of the Medici family were arranged, in Renaissance times, by Cellini, and No. 17 is the "broad" of Cromwell. The design of the last-named coin is by Simon, and it is to be noted how little this great artist availed himself of the opportunity, afforded to him by a complete change of design at this period, to introduce a really artistic reverse. The Royal cipher or monogram was often the main feature of the reverse of coins, as is shown in the ducat of Christian V. of Denmark given (No. 26) in the plate. In Nos. 27 and 28, shillings of George III. and George IV., two specimens are given of the heraldic treatment applied to coins in the earlier part of the present century.

Renaissance.

It will be readily admitted that the Renaissance was the period most fruitful in designs as beautiful as they were well suited for the purposes of coinage. It is easy to recognise in numismatic art, as in all other arts, the superiority of the fifteenth century, which was followed by a universal decline, from which the nineteenth century, in spite of many earnest efforts, has by no means recovered. The relation of Greek to Renaissance art has been well expressed by Mr. J. A. Symonds in a recent work,‡ and, as his remarks are specially applicable to coins, I cannot do better than quote him at some length. He points out that "it has been granted "only to two nations, the Greeks and the Italians, and to the "latter only at the time of the Renaissance, to invest every "phase and variety of intellectual energy with the form of "art. . . . . If the methods of science may be truly "said to regulate our modes of thinking at the present time, "it is no less true that, during the Renaissance, art ex-"ercised a like controlling influence." The difference between Greek and Renaissance art is easily defined. It has been shown above that the treatment of Greek coins was in the main sculpturesque, whereas the designs on Italian coins of the thirteenth and two following centuries may be considered to be essentially pictorial. The reason for this difference would appear to be that sculpture suited the requirements of Greek thought, which demanded the highest excellence and beauty in

* See Le Blanc's "Traité Historique des Monnoies de France," (1690), page 202.
† See Ruding's Plates, Supplement (Part II.), Plate XI., No. 17.
‡ "Renaissance in Italy : The Fine Arts," (London, 1877).

the delineation of physical proportions, while on the other hand the tendency of the religious thought of the middle ages could only be adequately expressed by the more subtle and varied means afforded by painting. There is no doubt that the Renaissance was at first a revival of classic art, and I regret that it has been impossible to find a coin by Niccolo Pisano, who was the first to combine the study of the antique with that of nature. Many examples might, however, be given of the masters of the Renaissance, and three have been selected as good illustrations of the fine work of this period. The first, No. 22, is by Francia, and is of special interest as having been struck at a time when Renaissance art, so far as painting is concerned, may be considered to have culminated. Nos. 23 and 24 are both by Cellini, (so few of whose authentic works, executed at a time when classical influence on the Renaissance was very strong, have been preserved,) the first prepared for Pope Clement VIII., and the second for Alexander, first Duke of Florence.* The latter bears the figures of SS. Cosmus and Damianus, and was considered by the artist himself to be the most beautiful coin in Christendom.

One circumstance contributed in no small degree to the excellence of coins of the Renaissance period, namely, that the training of the great painters, many of whom designed coins, commenced in the goldsmith's workshop, where they gained a practical knowledge of metal work as well as delicacy of execution. The influence of Renaissance work, however, on the English coinage must have been very slight. It might have been otherwise if Cellini, who resided in France and executed work for Francis I., had also accepted the invitation of Henry VIII. to visit his court, where, as pointed out in my Report for last year,† the Teutonic influence of Holbein was evident.

Of conventional ornament but few examples can be given, although its influence on coinage must always be very great. It would be difficult, perhaps, to select a better example than that of the lily which was the well known emblem of the city of Florence. The gold florins bearing this design were, according to Le Blanc,‡ first struck in 1068,§ and it was in use, with hardly any variations, for many centuries. So universally, indeed, was it imitated, that the coins bearing it may be said to have served the purposes of an international currency. The coin, No. 16, given in the plate, is of a rather late type, but the modifications of the original design were but slight.

No. 20 is a coin of Akbar, Mogul of Hindustan from 1556 to 1605, which is in many respects remarkable, as, underneath the principal design of the coin, the surface is covered with a delicate spiral arabesque, which differs from true Arab art in being slightly instead of wholly conventional. It serves to represent various branches of oriental art, of which other illustrations cannot be given.

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* Storia delle Monete de' Granduchi di Toscana, (Firenze 1756), page 6.
† Seventh Annual Report (1876), page 21.
‡ "Traité Historique des Monnoies de France," page 154.
§ More probably not until 1252. See "Il Fiorino d'Oro," (Firenze, 1738), page 1.

I must not omit to refer to the use which has at different times been made of the reverses of coins to commemorate historical events. This was especially the case in the Papal series, and indeed Evelyn's remark that reverses of medals are "so infinitely fruitful and full of erudition that, had we a perfect and uninterrupted series of them, we should need almost no other history,"* is also true of coins. With regard to the reverses adopted in this country at the general re-coinage of gold and silver in 1817, Ruding expresses his regret that advantage should not have been taken of the opportunity to "render the reverses of our coins historical records," and alludes to "a pattern crown by Mr. W. Wyon, which, in the true spirit of classical historical coinage, commemorates the legislative union with Ireland."†

Modern.

It is easy to trace in the reverses of modern coins the gradual decline of art from the reign of Anne to the beginning of the present century, and, on the Continent, the artistic corruption which pervaded the period antecedent to the French Revolution. The fact that coins have not always exactly reflected contemporary work has already been pointed out, and it is not surprising, therefore, that the coins of the present day hardly represent the revived appreciation of art which is evident in this country and throughout Europe. There appears to be a feeling that the reverses of coins should express, either in words or figures, their denomination or value; but I can hardly think that the practice of thus inscribing money is necessary or even advantageous. In a well-arranged system of currency the coins of each metal should be of but few denominations, readily distinguishable from each other, and it is scarcely too much to say that in every country one of the first things learnt by a child or a stranger is the relative value of the coins in common use. During the last half-century the efforts to secure an artistic reverse have been few and ineffectual, and both in this country and abroad the public taste appears to have been satisfied with such a design as a wreath surrounding words or figures indicating the value of the coins. It is difficult, therefore, to suggest what would be an acceptable device for the reverse of British coins, but it will, I think, be admitted that this indifference to beauty of design is no sufficient reason for perpetuating so feeble a method of treatment as that just mentioned and displayed in the example given, No. 29. The office of the decorative arts has been well described to be that of giving pleasure in things which must perforce be used,‡ and it may at least be hoped that excellence of design and workmanship will eventually combine to secure the fulfilment of this condition in the coins of the realm.

I must again acknowledge the valuable information and advice which I have received from Mr. Poole, Keeper of Coins and Medals at the British Museum, and the officers of his Depart-

* "Numismata," (London 1697), page 48.
† "Annals of the Coinage," vol II., page 401.
‡ "The Decorative Arts," an address by William Morris, (London, 1878).

ment, and the assistance rendered by Mr Roberts, Chemist of the Mint, in the preparation of this part of my Report.

Coinage of foreign countries.

United States.

The Report of the Director of the United States Mint for the fiscal year ended the 30th of June 1877 shows that both the gold and silver coinages of the year at the Mints at Philadelphia, San Francisco, and Carson, largely exceeded those of 1875–76. The total number of pieces struck was 85,968,992, of which more than 70,000,000 were subsidiary silver coins. The trade dollars issued for export to China were more numerous than those issued in the previous year by 3,000,000, and Dr. Linderman mentions facts to prove that their issue has been attended with decided advantages both as regards the commercial and mining interests of the United States, and that they are likely to supersede in a still greater degree than heretofore the Mexican dollars, which are their principal competitors in Chinese ports. The Report also contains much interesting information as to the expenses and receipts of the different Mints and Assay Offices, and the yield of the principal silver mines in the United States, and on other subjects connected with coinage and the movements of the precious metals. Dr. Linderman has also, under date of June 1877, published a work entitled "Money and Legal Tender in the United States," which contains, in a brief and convenient form, an account of the regulations affecting the coinage, and of the laws by which the currency generally was governed until the adoption of the recent measure for the re-monetisation of silver.

It is not necessary that I should here discuss the arguments which have been adduced in favour of restoring the silver standard in America, nor the causes which have contributed to its restoration; but it may be well that I should briefly enumerate the changes which have taken place in the monetary system of the United States since the first establishment, in 1792, of a national coinage, and should show what is its present position. The Act of 1792 constituted gold and silver, in the ratio of 1 to 15, the standards of value, and gave to coins of both metals unlimited currency. In 1834 and 1837 the weight and fineness of the gold coins were altered, and the ratio of gold to silver was fixed at 1 to 15·988 instead of 1 to 15, but, the ratio in the principal continental countries of Europe being 1 to 15½, this valuation of gold was found to be too high, and it became impossible to retain the silver coins in circulation. In consequence of the dearth of silver coins, the weight of the coins of denominations smaller than the dollar was, in 1853, reduced to an extent sufficient to ensure their retention in circulation, and they were at the same time made legal tender for the reduced amount of five dollars only. Dr. Linderman, in the work to which I have above referred,* gives it as his opinion that "the measures adopted in 1834 and 1853 were decided steps

* Money and Legal Tender in the United States, (New York, 1877), page 31.

" towards the establishment of a single gold standard, and were " no doubt so intended." In 1873 an Act was passed revising and amending the laws relating to the Mints, Assay Offices, and coinage of the United States, by which the gold dollar was declared to be the unit of value, and the silver dollar of 412½ grains, which had in fact become obsolete, was omitted from the coins authorised to be struck. At the same time the coinage of a " trade-dollar," weighing 420 grains, was authorised for commercial purposes, but without legal circulation in the United States. Gold therefore was constituted, in 1873, the sole standard of value. In 1876, however, Mr. Bland introduced into the House of Representatives at Washington a bill providing for the re-coinage of a silver dollar as a standard coin, and in the same year a joint resolution was passed by the Senate and House of Representatives, appointing a commission, consisting of three senators, three members of the House of Representatives, and experts not exceeding three in number, to enquire into (1) the change in the relative value of gold and silver, its causes and effects: (2) the policy of restoring the double standard in the United States: (3) the policy of continuing legal-tender notes concurrently with metallic standards: and (4) the best means of providing for the resumption of specie payments. In March 1877 the majority of this Commission issued a report, one of the recommendations of which was that silver should be re-monetised; and, on the 28th of February 1878, after much discussion, and the introduction of important amendments by the Senate, a bill was passed, over the veto of the President of the United States, by majorities of more than two-thirds in both Houses of the Legislature, restoring to the silver dollar of 412½ grains its position as a standard coin. The bill, as originally drawn, did not limit the amount of silver bullion which could be brought to the Mint for coinage, but, as amended by the Senate, it provides that silver shall be purchased by the Secretary of the Treasury at the rate of not less than $2,000,000, nor more than $4,000,000, per month, and coined into dollars, and the seignorage paid into the Treasury.

The issue of standard silver coins is, therefore, confined within strict limits; but the fact remains that the United States, which in 1873, after full deliberation, followed the example set by this country in 1816, and by Germany in 1871, and adopted the single gold standard, has in 1878, notwithstanding the expectant attitude maintained by the countries forming the " Latin " Union and by Holland, decided in favour of recurring to the double standard of gold and silver. The Act of February last directed that three commissioners should be appointed to confer with European Powers, with the view of " establishing internationally " the use of bi-metallic money and securing fixity of relative " value " between gold and silver in coinage. As, however, France, Belgium, Italy, Switzerland, and Greece, which form the " Latin " Union, have for many years maintained 1 to 15½ as the ratio between those metals, and other European countries

a fraction more than 1 to 14, whereas the American law adopts the ratio fixed in 1837 of nearly 1 to 16, it is evident that difficulties are likely to arise in coming to an agreement on this point. New designs had been prepared, in anticipation of the re-issue of silver dollars, and during the course of last month (April 1878) their coinage was resumed. It is understood that for the present they will only be issued in exchange, at par, for gold coin, and in payment for silver bullion purchased for coinage at the market price.

Germany.

No steps have been taken, since the date of my last Report, to complete the demonetisation of silver in Germany by the withdrawal from circulation of the thalers, which formed the most important part of the silver coinage before the recent changes in the German monetary system. Since the beginning of the present year official information has been given in the Financial Committee of the Reichsrath as to the condition of the currency reform. At the end of March 1878 the whole amount of the old coins withdrawn was 53,050,000*l.*, of which 4,550,000*l.* was in gold and 48,500,000*l.* in silver, and the Government estimated that there remained to be sold 20,000,000*l.* of silver coin still in circulation. The total amount of new money coined up to the date of this statement was 78,985,000*l.* in gold, and 21,275,000*l.* in silver coin. It is interesting to note that up to the end of December 1877 gold coin of the value of nearly 12,000,000*l.* had been struck on private account, including the amount coined on account of the Imperial Bank of Germany, and that recently the coinage of gold for private persons has been on the increase. It would appear that the rates at which foreign gold coin is received at the Bank of Germany make it more profitable to take such coin to one of the Mints to be re-coined into 20-mark pieces, notwithstanding the charge for minting and the loss of interest during the time the coin is in possession of the Mint, than to the Bank. A profit of 2,150,000*l.* had been realised on the coinage of the new subsidiary silver pieces, but on the other hand a loss of 3,125,000*l.* had been incurred on the sale of old silver coin, of which the total amount disposed of had been about 22,500,000*l.* To this net loss of 975,000*l.* there will ultimately have to be added such loss as may accrue in disposing of the whole or of a part of an estimated sum of 20,000,000*l.* still remaining to be withdrawn from circulation,* as it is believed that the coinage of the new silver tokens has already almost reached the limits prescribed by law.†

France, Belgium, Italy, Switzerland, and Greece.

The Governments of the countries forming the so-called "Latin" Union have made no alteration during the past year in the arrangements which they have found themselves obliged to adopt, since 1873, for limiting the coinage of silver. I showed in my last Report‡ that they had determined, at the close of 1876, to postpone until the month of November last the meeting of the

* See "Economist," 30th March and 27th April 1878.
† See "Economist," 17th November 1877.
‡ Seventh Annual Report (1876), page 29.

Representatives of the contracting powers which was to have been held in January 1877, to agree upon the amounts of standard silver coin to be struck by each country during the year, and that meanwhile the coinage of five-franc pieces in silver for the year remained limited by an article of the declaration made at the last Conference, held in 1876, to one-half the amounts then allotted to each country. No meeting, however, was held in November, and on the 29th of January last, it was stated by the Minister of Finance in the French Senate, that, as the question of the renewal of the Convention itself must be discussed before the 31st of December 1878, and it would be necessary, therefore, that the Contracting Powers should meet in October or November next, there would probably be no meeting before that time to settle the amounts to be coined during the current year. At the same sitting of the Senate a law was passed continuing till the 31st of March 1879 the effect of the law of the 5th of August 1876, which gave the Government power to limit or suspend the coinage of silver five-franc pieces till the end of 1878.

During the year 1877 France and Italy have availed themselves of the permission to coin silver accorded by the Conference of 1876, but in France no silver was received for coinage during the year, the coin issued having been struck from bullion sent in before the passing of the law of the 5th of August 1876 above mentioned, and the same course will be followed in 1878. Neither Switzerland, where the opinion of the Federal Council is in favour of the single gold standard, nor Belgium, where the Government have been empowered, since the end of 1873, to limit or suspend the coinage, have availed themselves of their right of coining silver during the year.

I append a statement of the coinages executed in France in 1877, from which it will be seen that the coinage of gold continued to be very large, while that of standard silver pieces was comparatively insignificant:

	Denomination.	Francs.	£
Gold - -	Twenty Francs	255,181,140 or	10,207,246
Silver -	Five Francs	16,464,285 „	658,571
Bronze -	Ten Centimes	79,576 „	3,183
	Five Centimes	97,939 „	3,917
	Two Centimes	10,000 „	400
	One Centime	10,000 „	400
		271,842,940	10,873,717

In 1875 and 1876 the gold coinage amounted to 9,396,480*l.* and 7,059,726*l.* respectively.

It is to be noted that specie payments were resumed by the Bank of France on the 1st of January last.

Holland. No change has taken place during the year in the position of the monetary question in the Netherlands. I showed in my last

Report* that the double standard of gold and silver still nominally prevailed in Holland, but with the important reservation that the coinage of silver was entirely prohibited, while that of gold was unlimited, and that, by a law passed on the 30th of December 1876, it was provided that the question of the coinage should again be considered before the 1st of January 1878. On the 9th of December another law was accordingly passed, postponing indefinitely the revision of the provisional measure of the 6th June 1875, by which the coinage of standard silver pieces, except on account of the State, was suspended, and no steps have since been taken by the Government to bring the subject of the coinage before the Chambers.

The following is a statement of the coinages executed by the Mint at Utrecht during the year 1877 :—

Denomination.	No. of Pieces.	£
Gold.—Ten-florin pieces -	1,108,149	or 923,457
Ducats (5·75 florins) -	14,785	„ 7,084
Silver (subsidiary coinage).— Ten-cents -	1,000,000	„ 8,333
Copper.—Cents - - -	11,026,000	„ 9,188
Half-cents - -	1,400,000	„ 583
Bronze.—Two-and-a-half-cents	4,000,000	„ 8,333
Cents - - - -	6,100,000	„ 5,083
Total -	24,648,934	„ 962,061

The coinage of copper pieces ceased before the 1st of July last, in virtue of a law of the 28th of March 1877, which replaced the copper coinage by bronze; and a Royal decree of the 18th of April 1877 ordered the issue of pieces of 2½ cents, one cent, and half a cent, of the same composition as the English and French bronze coinage, namely, 95 per cent of copper, four of tin, and one of zinc. No issue of bronze coin took place in the year 1877, but since the beginning of the present year a certain amount has been issued, chiefly in the provinces adjacent to Belgium and Germany. The copper coins still remain in circulation, and will not be withdrawn until the Government has a large stock of bronze coin in hand to substitute for them.

International coinage.

A certain degree of progress towards monetary unification still continues to be in course of realisation on the continent of Europe. For example, although Russia has not yet recognised either the metrical system of weights and measures or the single gold standard in the Empire at large, she has distinctly done so in the case of the Duchy of Finland, where, by a decree dated the 9th of August last, the unit of coinage is made a gold 10-mark piece, exactly identical, in weight, fineness, and value, with the

* Seventh Annual Report (1876), page 31.

French gold 10-franc piece, 310 of which are coined to the kilogram of gold $\frac{9}{10}$ths fine. The silver mark is decimalized by the same decree; the $\frac{1}{100}$th part being the exact equivalent of the French, Italian, Swiss, Belgian, Greek, and Roumanian centime. But, in the Finnish coinage scheme, the bi-metallic or double standard, which has not yet been finally discarded, although it exists only by sufferance and in a crippled form, in the currency legislation of the six countries just named, has been entirely suppressed by a provision making silver coin legal tender only to the extent of 10 marks or Finnish silver francs.

In Spain, again, in addition to the 25-peseta (or 25-franc) gold piece, to which allusion was made in my Report for last year,* progress has been made in the coinage of gold 10-peseta pieces, so that Spain is prepared practically to join the "Latin" monetary Union.

A gold piece, therefore, of 310 to a kilogram, and $\frac{9}{10}$ths fine, has already been coined or made legal tender in no less than thirteen European countries, namely, France, Italy, Switzerland, Belgium, Greece, Austria, Hungary, Sweden, Denmark, Norway, Finland, Roumania, and Spain.

Indian Mints.

The coinages of the Calcutta and Bombay Mints during the past two years have, owing to the low price of silver and the necessity for raising heavy loans to meet the expenses of the recent famine, been unusually large. I have received from the Master of the Mint at Calcutta a return of the coinage executed by that Mint during the year ended the 31st of March 1877, which shows that in that year no less than 111,926,429 pieces were struck, of which rather more than 17,000,000 were rupees, and the remainder subsidiary coins of silver and copper. No information has as yet reached this country as to the work of the Mints during the year ended the 31st of March 1878, but it has been publicly stated† that at the Bombay Mint the weight of the coinage executed has been 1,266 tons of silver and 62 tons of copper, and the total number of pieces struck no less than 123,864,518, of which 109,680,584 were rupees.

Japan Mint.

The amount of coinage executed at the Mint at Osaka during the year ended the 30th of June 1877 was again very large. The Imperial Commissioner's Report for the year shows that the total number of pieces struck was 114,536,000, of which only 214,228 were gold, consisting principally of 5-yen pieces, while of the remainder 29,185,000 were silver, including 2,425,000 trade-dollars, and 85,136,000 copper coins.

It has already been mentioned‡ that the pieces examined in

* Seventh Annual Report (1876), page 30.

† See "Times of India" (Bombay), 1 April 1878.

‡ Page 15.

this Department continue to prove the accuracy with which the Japanese coinage is executed.

New site for the Mint.

During the past year it was again proposed that steps should be taken to acquire land for the erection of a new Mint, and a deputation waited upon the First Commissioner of Works to discuss the question of the sale of a site to the Government. Among the points upon which the First Commissioner was requested to give information were some which have been frequently raised since the removal of the Mint to a new site was first proposed in 1871, and to which I may perhaps be allowed briefly to refer, as the answers which I was able to give to the questions put to me in connection with them may serve to make still clearer than has hitherto been the case how groundless are the apprehensions which have at times been expressed that the presence of the Mint would prove a disadvantage to the neighbourhood to which it might be removed. To a question whether the Refinery adjoining the present Mint would also be attached to a new Mint, I replied that the Refinery which originally formed part of the Mint premises has, since 1852, been leased to Messrs. Rothschild, and is in no way whatever connected with the work of the Department, and that no Refinery would be attached to a new Mint. In answering in the affirmative the question whether it was intended that the coinage of bronze, as well as of gold and silver, should be carried on in a new Mint, I pointed out that the mechanical operations are identical for all denominations of coin, and that the process of melting refined metals, such as are alone received at the Mint, and casting them into bars for coinage, is perfectly innocuous. I added that the process of melting bronze, which contains 95 per cent. of copper, 4 of tin, and one of zinc, must not be confounded with any operation of smelting, such as that of copper, which consists in the extraction of metal from the ore, and that in bronze melting no noxious fumes are generated, a statement the accuracy of which could be tested at the Mint in any way that might be desired. As regards the number of workpeople likely to be employed, I stated that the number of workmen and boys employed in the manufacture of coin is 51, and that this number might probably be slightly increased in a new Mint, but that they do not belong to the class of operatives generally described as "workpeople," as, owing to the peculiar nature of the work, and the exceptional rate of wages given, the workmen of the Mint are selected, as they have always been, from a superior class, and in conduct and appearance are careful to maintain their position. In answer to a further question whether the works proposed to be carried on at the new Mint would be at all likely to affect injuriously the health of the neighbourhood, or to diminish the value of adjacent land, I was able to forward

the report of Mr. Bramwell, F.R.S., the eminent engineer, which was annexed to my Annual Report for 1876,* and that of Mr. T. W. Keates, Chemist to the Metropolitan Board of Works, to which I also referred last year,† amply testifying to the innocuous character of the operations of minting.

It will be seen, therefore, that the work of a new Mint would be confined to the production of coin only, and could be in no way injurious to the neighbourhood; and it is difficult to see how the proximity of a Mint could diminish the value of land. In Paris, Madrid, Vienna, Berlin, Brussels, and elsewhere, the Mints are placed in central positions, and in the midst of the other most important public buildings. The Paris Mint is on the Quai Conti, on the banks of the Seine, directly opposite the Louvre, that at Madrid on the Prado (which is the equivalent of the drive in Hyde Park), that at Vienna on the Prater, and that at Berlin in the very centre of the town, and close to the palaces of the Emperor and Prince Imperial.

Their Lordships are fully aware, if only from the facts to which their attention has been called in these Reports, how antiquated the arrangement and machinery of the Mint have become, and how insufficient its power is to meet the requirements of the present day. I will not, therefore, again refer in this place to the possibility that a break-down such as that which occurred in 1876 might bring the operations of the coinage to a stand-still at a moment when the demand for coin might be most pressing, nor to the inability of the Department, even in ordinary years, to undertake a large part of its legitimate work. I have thought it right, however, to give the above details respecting the latest proposal for the removal of the Mint, and I would only in conclusion point out once more that the question of the reconstruction of the Mint buildings and the renewal of its machinery is one which urgently requires solution.

I have the honour to be,
Sir,
Your obedient Servant,
C. W. FREMANTLE,
Deputy Master of the Mint.

The Secretary,
Treasury.

Royal Mint, 8th May 1878.

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* See Seventh Annual Report (1876), pages 16, 41, 55.
† Seventh Annual Report (1876), page 16.

APPENDIX.

No. I.

MEMORANDUM BY MR. HILL, SUPERINTENDENT OF THE OPERATIVE DEPARTMENT.

MELTING HOUSE.

The work in this Department has been rather under the average during the past year. Of gold, the weight melted amounted to 1,242,040 ounces, equal to about 38 tons, as against 3,972,466 ounces, or 121½ tons, melted in the year 1876. No less than 400,000 ounces of light gold coin withdrawn from circulation are included in the above weight, nearly all of which was cast into bars for the coinage of half-sovereigns.

The weight of silver melted during the year 1877 was 3,220,584 ounces, or about 98½ tons, as against 2,068,036 ounces, or 63¼ tons, melted in 1876. Of this amount 657,056 ounces consisted of worn coin withdrawn from circulation.

The bronze melted weighed 125 tons, and consisted entirely of scissel. One ton of copper was granulated for use as alloy metal.

COINING DEPARTMENT.

The machinery in the Rolling Room has worked satisfactorily throughout the year, and the out-turn of work shows a great improvement over that of the preceding year, which is partly to be accounted for by the fact that the machinery was put into thorough repair during the suspension of work consequent upon the accident to the 40 horse-power engine in 1876. In the Annealing Room I have during the past year introduced plumbago annealing pans, in lieu of the copper tubes previously used, and the success which has attended their adoption has been far beyond my anticipations. As a rule, the copper tubes were capable of sustaining an average of only 20 heatings, whereas the plumbago pans undergo 70 or 80 before becoming useless; so that, as the cost of a plumbago pan is about one-fourth of that of a copper tube, a considerable saving is effected. In using these annealing pans it is necessary to keep them in the furnace longer than the copper tubes, and, after cooling, to dry them thoroughly before returning them to the furnace with another charge. In one of the Press Rooms a new Uhlhorn lever coining-press, purchased from Messrs. Ralph Heaton and Sons, of Birmingham, has been erected. Two of these presses are now therefore in constant work, with most satisfactory results, their out-turn being at the rate of between 85 and 90 pieces per minute.

Machinery Department.

The machinery having been thoroughly examined and put into order in 1876, as stated in my Memorandum for that year, and the work of the Mint having been during 1877 of a much lighter character than usual, the artificers have merely been called upon to effect the repairs and renewals which will be necessary so long as the present antiquated machinery is retained. These repairs have to be accomplished after the conclusion of the day's coining operations, so that the work may be continued on the following day. The amount, therefore, paid for "overtime" has been considerable.

The new first-motion wheel fitted to the 40 horse-power engine in 1876 has worked thoroughly well, and has fully realised the expectations then formed regarding it.

Advantage was taken of the short suspension of work in August last, to overhaul the 40, 20, and 6 horse-power engines, which were partly taken to pieces, cleaned, examined, and put into thorough working order.

In December an accident happened to the small atmospheric engine in the Weighing Room, which caused some little delay in the work. The Weighing Room having up to that time been entirely dependent upon the engine in question, provision was made to work the automaton weighing machines directly from the 20 horse-power engine, which can now be used on the recurrence of any such emergency.

During the year, Nos. 1, 2, 3, and 4 boilers, with the smoke-burning apparatus attached to them, have been put into good working order, and a newly-geared intermediate wheel has been placed in position between Nos 1 and 2 mills in the Rolling Room.

Besides carrying out the above-mentioned repairs, the artificers have examined and repaired the pumps used to raise water from the deep well to the main tank. The supply of water in this well has of late years diminished to such an extent that the pumps cease to throw after being at work a few hours, and it will be necessary to determine during the current year whether the pumps should be lowered some 30 feet.

One set of sovereign moulds has been re-planed and fitted, and the screw coining-presses have been examined, cleaned, and repaired.

Die Department.

During the year 1877, this Department has sunk 4,437 matrices, punches, and dies for the Imperial coinage, and 447 matrices, punches, and dies for Colonial coinages, or a total of 4,884 matrices, punches, and dies for various denominations of coin.

In addition to the above, the Department has furnished 31 war-medal dies, and the usual dies for the Standards Department of the Board of Trade; besides which, 8,400 medals for the Army and Navy were struck and finished, together with 8,304 medal bars and clasps. It has also supplied for the Board of Trade 3,000 bronze tokens to be used by the men employed in working the "Rocket Apparatus" at the different stations in the United Kingdom, as well as 68 gold and silver medals for the Foreign Office, 14 silver and 24 bronze medals to be given by the Board of Trade for saving life at sea, and the usual medals for the University of London and the Royal Society. A set of medals was also prepared for the Museum of the Public Library at Melbourne, and specimens of certain Colonial coins were struck for the Museum of the Paris Mint.

In my Memorandum for 1876, I drew attention to the defective quality of the steel supplied to this Department. Applications have since been made to various firms to send in samples of steel suitable for the manufacture of dies, and I have to report with much satisfaction that steel of a very superior quality, and specially adapted for coining purposes, has now been obtained. Experiments are still in progress for testing the qualities of the different steels supplied.

I append the usual statement of the number of coins struck during the year 1877, and the number of dies used for the Imperial coinage during the years 1875, 1876, and 1877 respectively.

ROBERT A. HILL,
Superintendent of the Operative Department.

Royal Mint,
25th March 1878.

STATEMENT of the Number of Coins struck at the Royal Mint during the Year 1877.

Denomination.	Number.	Nominal Value.		
		£	s.	d.
IMPERIAL:—				
Gold: Half Sovereigns	2,197,482	1,098,741	0	0
Silver: Half Crowns	447,059	55,882	7	6
„ Florins	682,292	68,229	4	0
„ Shillings	2,980,703	149,035	3	0
„ Sixpences	4,066,486	101,662	3	0
„ Fourpences (Maundy money only)	4,850	80	16	8
„ Threepences	2,626,881	32,836	0	3
„ Twopences (Maundy money only)	7,189	59	18	2
„ Pence (Maundy money only)	8,936	37	4	8
Bronze: Pence	9,624,747	40,103	2	3
„ Halfpence	5,209,505	10,853	2	8½
STRAITS SETTLEMENTS:—				
Silver: Twenty Cents	55,000	2,291	13	4
„ Ten Cents	160,000	3,333	6	8
„ Five Cents	60,000	625	0	0
HONG KONG:—				
Bronze: Cents	2,000,000	4,166	13	4
	30,131,130	1,567,936	15	6½

STATEMENT of the Number and Denominations of Pieces coined, with the Number of Dies used in their production, during the Years 1875, 1876, and 1877.

Denomination of Coin.	1875.			1876.			1877.		
	Number of Pieces coined.	Number of Dies used.	Number of Pieces struck per Pair of Dies.	Number of Pieces coined.	Number of Dies used.	Number of Pieces struck per Pair of Dies.	Number of Pieces coined.	Number of Dies used.	Number of Pieces struck per Pair of Dies.
Sovereigns	—	—	—	4,943,347	272 + 350	15,895	—	—	—
Half Sovereigns	956,136	118 + 41	12,026	5,483,826	476 + 143	17,718	4,036,837	395 + 167	14,366
Half Crowns	1,261,806	126 + 73	12,682	724,344	62 + 30	15,747	499,768	37 + 41	12,814
Florins	1,432,526	78 + 90	17,054	588,978	43 + 34	15,298	796,177	57 + 58	13,846
Shillings	4,745,683	120 + 67	50,756	1,397,542	42 + 37	35,381	3,192,974	81 + 54	47,304
Sixpences	4,183,176	125 + 69	43,126	1,016,957	38 + 20	35,067	4,899,119	177 + 97	35,760
Threepences	3,693,170	206 + 49	28,966	2,027,622	209 + 39	16,352	3,283,457	284 + 94	17,373
Maundy Fourpences	4,154	10 + 3	640	5,100	7 + 7	729	6,162	6 + 7	948
„ Threepences	4,231	2 + 4	1,410	5,466	4 + 5	1,215	4,568	8 + 9	537
„ Twopences	5,745	6 + 2	1,436	7,371	3 + 1	3,685	7,539	6 + 7	1,160
„ Pence	8,459	2 + 4	2,820	12,813	8 + 4	2,135	10,501	13 + 11	875
Pence	10,807,263	463 + 398	25,104	—	—	—	9,802,987	519 + 473	19,764
Halfpence	5,506,750	120 + 203	34,098	—	—	—	5,312,464	172 + 276	23,716
Farthings	752,450	39 + 21	25,082	—	—	—	—	—	—
	33,361,549	1,415 + 1,024 *2,439	27,356 (Average)	16,213,366	1,164 + 670 †1,834	17,681 (Average)	31,852,553	1,755 + 1,294 ‡3,049	20,894 (Average)

* Including 696 worn dies re-sunk, and again finished for coining. † Including 644 worn dies re-sunk, and again finished for coining.
‡ Including 344 worn dies re-sunk, and again finished for coining.

No. II.

Memorandum by Mr. Roberts, F.R.S., Chemist of the Mint.

I append the usual statement of the number of assays made in the Office from the 1st of January to the 31st of December 1877 :—

Gold.		
Assays of bars - - - -	2,163	
„ coin - - - -	914	
Check assays on fine gold - - - -	253	
		3,330
Silver.		
Assays of bars - - - -	2,394	
„ coin - - - -	757	
Check assays on fine silver - - -	238	
		3,389
Total number of assays made during the year -		6,719

The total number of assays made during the preceding year was 12,038.

I have also assayed certain of the coins struck at Sydney and Melbourne, and the results showed that in these Mints a remarkably high degree of accuracy is maintained. Pyx coins from Bombay and Calcutta have also been assayed by request of the India Office, and their average composition was found to be satisfactory.

I am again able to record that the coins submitted to me from the Imperial Mint at Osaka have afforded abundant evidence of the care and fidelity with which the Japanese Government continues to conduct the operations of coinage.

Improvements in the Manufacture of Dies.

In the month of October last I was directed to accompany the Deputy Master of the Mint in visiting certain European Mints where experiments were in progress with a view to the permanent adoption of a process of die-sinking which differs essentially from that now in use, and renders it possible to produce very durable dies with much rapidity. The principles on which the process is based are well known, and were practised in this country early in the present century, but, as important details of manipulation remain secret, it was only possible to ask for opinions on the value of the process generally, and to seek information as to the durability of dies produced by it. The experience already gained by officers of certain Mints enabled them to offer satisfactory assurances on the latter point, but unfortunately in this country it would be useless to submit the question of durability to the test of experiment, as it is quite uncertain how far the molecular structure of the dies is impaired by the ponderous vacuum presses still retained in the Mint. On the Continent the condi-

tions are different, as lever presses are universally employed, and it is therefore quite an open question whether the adoption of the new process by this Department would increase the efficiency of dies in the same ratio as has been found to be the case elsewhere. I would refer to some remarks on the quality of steel suitable for dies which will be found in my Report on European Mints.* I there stated that "steel "which would not withstand the sudden impact of the press at present "in use in the Mint might nevertheless be well adapted to sustain the "more prolonged pressure of either the Uhlhorn or the Thonnelier," and I pointed out that it would not be advisable to commence a lengthy series of experiments as to the relative merits of different varieties of steel until a form of coining press had been definitively determined upon. The real value of the process can of course only be ascertained by an extended inquiry: but, as coins struck by dies prepared by the new process leave nothing to be desired in point of accuracy or finish, it is to be hoped that some means may be found for conducting such experiments as will yield results which may be compared with those obtained by officers of Continental Mints, to whom the Department is already indebted for much valuable information as to the working of the new process.

Scientific Library.

The few scientific works in the Mint library consist of monographs and papers presented, for the most part, by foreign writers, and it is to be feared that, in the absence of current scientific literature, important papers of special interest to the Department have escaped attention, and its efficiency has suffered in consequence. It appeared advisable therefore to commence the formation of a scientific library by securing certain standard works of reference, as well as some of the Physical and Chemical journals published in this country and on the continent.

Density of Alloys of Gold and Copper.

I published last year details of experiments which were made at the suggestion of Dr. Broch, Professor of Mathematics at Christiania, with a view of ascertaining whether it might be possible to establish a relation between the composition and density of gold-copper alloys. The experiments justified the belief in the possibility of deducing the fineness of gold coins from their densities, and showed that it would be easy to verify the standard of masses of gold coins without destroying their integrity.

As I find that my remarks on this subject were not quite understood, it may be well to point out that the method, being essentially one of verification and not of assay, is only suitable for ascertaining the exact fineness of coins the genuineness of which is beyond question, but would not render it possible to detect the nature of an alloy, such as a certain one of platinum and copper, which has the same density as standard gold.

I have received from Dr. Broch some observations on the results given last year, and, as they possess much interest, I append the more important of them. He writes,—

"Since the publication of my paper on the density of gold coins, I have determined the density of the water I employed, and find it to be 1·00015. The mean density

* Report on European Mints, Parliamentary paper 466, Session 1870, p. 27.

of the 60 Scandinavian gold coins, which was found to be 17·1685, would then, in absolutely pure water, be 17·1711. * * * * * I also find the mean density of ten sovereigns to be, in pure distilled water, 17·4890 * * * * M. Henri Ste. Claire Deville has prepared 108·682 grammes of pure gold; the density of this when cast was found to be 19·281, and, after rolling to one fourth of its original thickness, the density was found to have risen to 19·3238, which coincides very closely with your number 19·3203. M. Stas has also prepared with great care a disc of pure gold weighing 115·656 grms. The density of this when cast was 19·2860, and after compression in a coining press was found to be 19·3056, which agrees nearly with the result obtained by G. Rose.

I think that the density of copper in gold coins ought to be taken as 8·82.

The numbers 19·3203 as density of gold, and

8·8200 „ copper,

taken in connection with last year's experiments, would show that by alloying gold and copper an expansion takes place. But this will not be any objection to the use of the density of gold coins as a means of controlling their fineness. Indeed an empirical formula may easily be made to express the expansion. But to find this formula it would be necessary to have also alloys of about equal quantities of gold and copper, and of less gold and more copper. It is possible that one of these metals has more influence on the expansion than the other; that, for instance, one part of gold alloyed with nine of copper would give either more or less expansion than nine parts of gold alloyed with one of copper.

If both metals have equal influence on the expansion we may arrange the formula thus:—

$$\frac{1}{d} = \frac{m_1}{d_1} + \frac{m_2}{d_2} + m_1 m_2 x$$

$$\text{or } \frac{1}{d} = \frac{m_1}{d_1} + \frac{m_2}{d_2} + m_1 m_2 x + (m_1 m_2)^2 y$$

d being the density of the alloy,
d_1 „ pure gold,
d_2 „ copper,
m_1 the proportion of gold,
m_2 „ „ copper,
$m_1 + m_2 = 1$

and x y coefficients to be determined by subjecting the experiments to calculation by this formula. If it be found that copper has less influence on the expansion than gold, that the expansion in an alloy of 1 gold with 9 copper is less than in an alloy of 9 gold with 1 copper, we may adopt the formula:

$$\frac{1}{d} = \frac{m_1}{d_1} + \frac{m_2}{d_2} + m_1 m_2^2 x$$

or something like this. It will always be possible in this way to find an empirical formula representing the facts. Submitting your experiments to calculation with the formula

$$\frac{1}{d} = \frac{m_1}{d_1} + \frac{m_2}{d_2} + m_1 m_2 x$$

and accepting 8·82 as the density of the copper employed, I find:

$$\frac{1}{d_1} = 0{\cdot}051759$$

$$\frac{1}{d_2} = 0{\cdot}113379$$

m_1	$\frac{1}{d}$ or real volume.	$\frac{m_1}{d_1} + \frac{m_2}{d_2}$ or calculated volume without expansion.	$m_1 m_2 x$ or expansion.	expansion per cent.	$m_1 m_2$	x
0·9801	0·053083	0·052985	0·000098	0·185	0·019504	0·00500
0·9688	0·053820	0·053682	0·000138	0·257	0·030226	0·00458
0·9588	0·054478	0·054298	0·000180	0·332	0·039503	0·00455
0·9484	0·055196	0·054939	0·000257	0·468	0·048937	0·00526
0·9385	0·055760	0·055549	0·000211	0·380	0·057718	0·00366
0·9320	0·056208	0·055949	0·000259	0·463	0·063876	0·00408
0·9228	0·056922	0·056516	0·000406	0·718	0·071240	0·00569
0·9005	0·058257	0·057890	0·000367	0·634	0·089600	0·00409
0·8805	0·059502	0·059123	0·000379	0·641	0·105220	0·00360
0·8614	0·060668	0·060300	0·000368	0·610	0·119390	0·00308

The alloys of 0·9484 and of 0·9228 fineness show a much greater expansion than the others; this may be explained by supposing that cavities exist which do not communicate with the surface of the casting, and are not obliterated by subsequent compression, or the cavities may perhaps be only partially closed. It would be desirable, in the case of the two alloys to which allusion has just been made, to subject the discs to two or more successive compressions under the medal press, each time taking the density and continuing the compression to a maximum. With the smaller gold coins the risk from cavities is less, because the coins are submitted to a proportionately greater compression than larger discs, and the presence of any great cavities may at once be detected by sound. Excluding those two alloys we have, as a mean value, $x = 0{\cdot}00408$, which will give the following calculated densities.

m_1	$\frac{1}{d}$.	Calculated densities.	Observed.	Differences.
0·9800	0·053065	18·8448	18·8385	+0·0063
0·9688	0·053805	18·5856	18·8805	+0·0051
0·9588	0·054459	18·3624	18·3562	+0·0062
0·9385	0·055784	17·9263	17·9346	−0·0077
0·9320	0·056208	17·7911	17·7911	0.
0·9005	0·058256	17·1656	17·1653	+0·0003
0·8805	0·059552	17·7920	16·8062	−0·0142
0·8614	0·060787	16·4509	16·4832	−0·0323

The last two observations do not coincide well with the calculated densities; and, as the observed density here is greater than the calculated, this seems to indicate that the expansion increases less than the product $m_1 m_2$. A number of experiments with alloys with still more copper and less gold would be necessary to decide if another formula ought to be employed.

The above formula would give for gold coins of fineness 0·916 a density 17·4810, and of fineness 0·900, the density 17·1561, both less than direct observations on gold coins seem to indicate.

The experiments with fineness 938·5, 932·0, 900·5, and 880·5 alone would give $x = 0{\cdot}00386$, and therefore:—

m_1	$\frac{1}{d}$	Densities calculated.	Observed.	Differences.
0·9385	0·055772	17·9301	17·9340	+0·0039
0·9320	0·056194	17·7955	17·7911	−0·0044
0·9005	0·058236	17·1715	17·1653	−0·0062
0·8805	0·059529	16·7985	16·8062	+0·0077

This formula:

$$\frac{1}{d} = \frac{m_1}{19{\cdot}3203} + \frac{m_2}{8{\cdot}82} + 0{\cdot}00386\, m_1 m_2$$

will give, for $m_1 = \frac{11}{12}$, $m_2 = \frac{1}{12}$ (British gold coins),

$d = 17{\cdot}4859$ (my observation 17·4890)

and for $m_1 = 0{\cdot}9$, $m_2 = 0{\cdot}1$

$d = 17{\cdot}1620$,

M. Ste. Claire Deville's observations on a mass of 800 frs. in gold, giving 17·1656.

I think this formula may be applicable to gold from 0·94 to 0·88 fineness.

It will be evident, therefore, that the results given last year as the density of gold of 900 and 916·6 fineness are in close accordance with those obtained by Dr. Broch and M. H. Ste. Claire Deville respectively.

The experiments were continued, with a view to ascertain the effect of compression and annealing on density, at the suggestion of Sir William

Thomson, who, in a very important paper recently published,* expresses the following views as to the molecular structure of metals.

"It is not probable that any degree of pressure acting equally in all directions on a piece of common glass, or rock crystal, or of diamond, or on a crystal of bismuth, or of copper, or of lead, or of silver, would make it denser after the pressure is removed. . . . . Malleable metals and alloys, on the other hand, may have their densities considerably increased and diminished by hammering and by mere traction. By compression between the dies used in coining, the density of gold may be raised from 19·258 to 19·367;" and, on the other hand, experiments have shown that a piece of copper wire decreased in density from 8·91 to 8·835 after successive simple tractions: but other experiments showed an *augmentation* of density from 8·85 to 8·95, the wire having been first annealed.

"Augmentation of density is a somewhat surprising result, but not altogether so when we consider that the wire had been reduced to an abnormally small density by the previous thermal treatment. The common explanation of these changes of density of metals, which attributes them to porosity, is probably true; by porosity being understood a porous structure with such vast numbers of the ultimate molecules in the portions of the solid substances between pores or interstices that these portions may be called homogeneous in the sense that a crystal or a liquid can be called homogeneous."

The following table gives the results of experiments made to determine the effect of compression and annealing dies of pure and standard gold prepared by casting the metal in the recess formed by surrounding the flat top of a polished steel cylinder with a collar. The discs could readily be compressed by placing them in a collar similar to that in which they were cast, and by submitting them to the pressure of a medal press between two unengraved dies of polished steel. Each disc weighed about 28 grammes, and was suspended in a small cage of platinum wire by a hair, a correction being in every case applied for the amount of water displaced by the hair as well as by the cage.

TABLE showing the effect of Compression and Annealing.

	Densities of the Cast Discs.	Mean.	Densities of the Discs after Compression.	Mean.	Densities of the Discs after Annealing at 280° C.	Mean.	Densities of the Discs after Annealing at a dull red heat.	Mean.
PURE GOLD	19·3710 19·3726 19·3822	19·3753†	19·4086 19·4132 19·4152	19·4123	19·4153 19·4100 19·4104	19·4119	19·3943 19·4026 19·4017	19·3995
STANDARD GOLD [920]	17·4068 17·3967 17·4048	17·4028	17·5682 17·5651 17·5669	17·5664	17·5418 17·5406 17·5424	17·5416	17·5325 17·5349 17·5363	17·5346

† It may be observed that the fine gold casting is an unusually sound one, as its density proved to be considerably higher than that generally accepted as the density of cast gold.

In the case of standard gold, compression raises the density by 0·940 per cent., but it will be evident that fine gold is less affected either by compression or annealing than standard gold; indeed annealing at 280° C. in an oil-bath appears to have no effect whatever on pure gold, while a red heat only lowers the density by 0·066 per cent.

In the case of compressed standard gold, annealing at a dull red

* Encyclopædia Britannica, Article "Elasticity," Ninth Edition, Vol. VII., p. 796. 1877.

heat lowers the density by 0·181 per cent., but heating to 280° C. reduces the density by 0·141 per cent., and the fact that so great an effect is produced by so moderate a degree of heat is somewhat remarkable.

The effect of rolling and traction may differ from that of compression, and an extended series of experiments, conducted with the greatest possible care by Mr. Edward Rigg, one of the Assistant Assayers, is in progress with a view to obtain definite information on this point. Fine gold has as yet alone been operated upon, and the results hitherto obtained show that by gradually reducing the thickness of an ingot from 8·4 to 0·38 millimetres, without annealing, the density was raised from 19·2935 to 19·4897. A further extension to 0·23 millimetres appeared to decrease the density to 19·4844, but it remains to be seen whether this result is borne out by subsequent experiment.

Other researches in progress.

In 1823 Becquerel suggested that the standard fineness of an alloy might be indicated by the electromotive force developed when the alloy is placed in an exciting fluid together with an alloy of known composition. The subject was partially investigated by Œrsted in 1828, and, as its practical importance was pointed out by Gay Lussac in 1832, it appeared desirable to make some experiments in order to ascertain how far the more delicate appliances in use at the present day would yield useful results. The experiments are now in progress, but are not sufficiently advanced to be described in this report.

A lengthy investigation has been commenced in the hope of being able to extend the researches of the late Mr. Graham on the "Transpiration of liquids" to the passage of metals and alloys through capillary tubes while in a molten state; the results will be submitted to the Royal Society.

W. Chandler Roberts.

Royal Mint, 2nd March 1878.

No. III.

General Account of Expenses and Receipts.

Abstract Statement, showing the payments in the Year ended 31st December 1877, for the Salaries and Expenses of the Royal Mint; the amounts of Profit or Loss resulting in the Year on account of the Silver and Bronze Coinage (as per Accounts appended); and the amount realised by the sale of Sweepings from the Gold Coinage, and other miscellaneous receipts of the Mint payable to the Exchequer.

	£	s.	d.	£	s.	d.
Payments in the year for salaries and expenses, viz.:						
Salaries, allowances, and wages	17,035	0	9			
Police	690	16	10			
Incidental office expenses	181	14	2			
Machinery and repairs	2,164	3	3			
Incidental coinage expenses	2,939	3	11			
Brokerage	250	1	11			
				23,261	0	10
Superannuation and compensation allowances				4,724	9	9
Amount of expenditure incurred in the year by other Departments on account of the Mint, viz.:						
By the Office of Works, for repair of buildings, parochial rates, fuel, gas, &c.	3,894	7	6			
By the Stationery Office for stationery, &c.	120	0	0			
				4,014	7	6
				31,999	18	1
Cost of alloy metal for gold coinage				Nil.		
Loss on gold coinage (waste, partially recoverable in the sweepings)				412	18	6
Loss on worn silver coin exchanged (as per Account, page 52)				25,775	11	0
Do. exchanged at the Sydney Mint				2,968	13	9
				61,157	1	4
Excess of receipts over the total expenses of the Mint in the year ended 31st December 1877				32,041	15	4
				93,198	16	8

Royal Mint,
15th March 1878.

	£	s.	d.	£	s.	d.
Profit on silver bullion purchased in the year for coinage (as per Account, page 47)				53,576	14	2
Profit on bronze coinage (as per Account, page 48)				37,797	6	4
Amount received for Sweepings from the Gold Coinage				Nil		
Miscellaneous receipts, viz.:						
For dies supplied for the Sydney and Melbourne Mints	181	17	6			
For striking medals, making assays, and other Mint charges on account of the Indian and Colonial Governments	999	18	4			
For rent of Refinery, and other miscellaneous receipts	643	0	4			
				1,824	16	2
				93,198	16	8

C. W. Fremantle,
Deputy Master of the Mint.

No IV.

SILVER COINAGE ACCOUNT

ACCOUNT of the payments made in the Year ended 31st December 1877, for the purchase of Silver Bullion and for worn Silver Coin; the amount received for Silver Coin sold; and the value of Silver Coin and Bullion in store at the commencement and close of the Year; showing the amount of Profit realised on the Silver Bullion purchased for Coinage, and the Loss resulting from the exchange of worn Silver Coin, in the Year.

	Silver Bullion.	Worn Silver Coin.
	£ s. d.	£ s. d.
Mint value of silver coin and bullion in store at the commencement of the year:		
£ s. d.		
Coin - - 88,257 4 3		
Bullion - - 152,608 4 8		
	240,865 8 11	
Amount paid in the year for silver bullion purchased - - - - -	310,290 8 9	
Mint value of worn silver coin melted into bullion (transferred as per contra)	181,504 9 0	
Amount paid for metal (for alloy) - - - Nil.		
Value of copper (for alloy) transferred from Copper Coinage Account - - -	146 0 0	
Amount paid in exchange for worn silver coin at the nominal value (660,016·212 oz.) - - - -	- - - -	207,280 0 0
Profit on silver bullion purchased for coinage - - - -	53,576 14 2	
	786,383 0 10	207,280 0 0

	Silver Bullion.	Worn Silver Coin.
	£ s. d.	£ s. d.
Amount received in the year for silver coin sold at its nominal value - -	424,701 10 3	
Amount received for sweepings - -	194 18 11	
Mint value of silver coin melted into bullion (660,016·212 oz. at 5s. 6d. per oz.) transferred to silver bullion account as per contra - - - - -	- - -	181,504 9 0
Mint value of silver coin and bullion in store at the end of the year :—		
£ s. d.		
New coin at its nominal value - - 84,809 7 6		
Bullion at the Mint value of 5s. 6d. per ounce - - 276,677 4 2		
	361,486 11 8	
Loss on worn silver coin exchanged -	- - -	25,775 11 0
£	786,383 0 10	207,280 0 0

	£ s. d.	£ s. d.
Seignorage on Bullion purchased - -	53,703 6 1	
Amount received for sweepings - -	194 18 11	
		53,898 5 0
Deduct:		
Waste (partially recoverable in sweepings) -	175 10 10	
Amount paid for Alloy Metal -	146 0 0	
		321 10 10
Profit, as above, on silver bullion purchased - -		53,576 14 2

Royal Mint,
15th March 1878.

C. W. FREMANTLE,
Deputy Master of the Mint.

No. V.

COPPER (BRONZE) COINAGE ACCOUNT.

ACCOUNT of the payments made in the Year ended 31st December 1877, for the purchase of Copper and other Metal for Bronze Coinage, including old Copper Coin; the amount received for Bronze Coin and old Copper sold; and the value of Bronze Coin and Metal in store at the commencement and close of the Year; showing the amount of Profit or Loss which has resulted in the Year.

	£	s.	d.	£	s.	d.
Value of bronze coin and metal in store at the commencement of the year :—						
Bronze coin (at its nominal value)	13,168	8	7			
*Bronze bars (at the Mint value)	46,718	1	1			
Old copper coin (at the market value of the metal)	763	18	2			
Tin (do.)	58	3	3			
Zinc (do.)	17	0	2			
				60,725	11	3
Amount paid in the year for bronze metal	8,087	10	0			
For copper						
For tin				Nil		
For zinc						
				8,087	10	0
Amount paid for old copper coin (at its nominal value)				1,304	18	9
				70,118	0	0
Balance, viz.:						
Profit on bronze coinage	37,797	6	4			
Amount realised by the sale, &c., of surplus metal (old copper coin)	146	0	0			
				37,943	6	4
				£108,061	6	4

	£	s.	d.	£	s.	d.
Amount received in the year for bronze coin sold at its nominal value				41,500	0	0
Amount received for sweepings				Nil		
Value of old copper coin transferred to Silver Coinage Account (for alloy)				146	0	0
Value of bronze coin and metal in store at the end of the year :—						
Bronze coin (at its nominal value)	26,843	19	11			
*Bronze bars (at the Mint value)	38,577	1	5			
Old copper coin (at the market value of the metal)	927	10	9			
Tin (do.)	52	0	6			
Zinc (do.)	14	13	9			
				66,415	6	4
				£108,061	6	4

* The value of bronze bars is calculated on the assumption that a proportion will be coined into pence and the remainder into halfpence and farthings.

Royal Mint,
15th March 1878.

C. W. FREMANTLE,
Deputy Master of the Mint.

No. VI.

Consolidated Fund Advances and Repayments.

An Account of the sums advanced in each Year from the Consolidated Fund for the purchase of Bullion for Coinage; and of the sums paid in each Year to the account of Her Majesty's Exchequer at the Bank of England in repayment thereof.

Date.	Amounts Advanced from the Consolidated Fund.			Amounts paid into the Exchequer in Repayment of Advances.			Remarks.
	£	s.	d.	£	s.	d.	
1837	22,000	0	0				
1838	196,029	19	4	168,029	19	4	
1839	400,000	0	0	350,000	0	0	
1840	170,000	0	0	175,000	0	0	
1841	100,000	0	0	135,000	0	0	
1842	180,000	0	0	162,120	4	0	
1843	350,000	0	0	265,000	0	0	
1844	550,000	0	0	501,389	17	0	
1845	850,000	0	0	678,772	2	9	
1846	300,000	0	0	429,937	1	11	
1847	100,000	0	0	217,033	10	2	
1848				18,534	3	1	
1849	150,000	0	0	126,000	0	0	
1850	150,000	0	0	120,000	0	0	
1851	100,000	0	0	137,213	1	1	
1852	391,970	0	8	191,970	0	8	
1853	508,029	19	4	550,000	0	0	
1854	100,000	0	0	200,000	0	0	
1855	250,000	0	0	300,000	0	0	
1856	450,000	0	0	450,000	0	0	As given in detail in previous Returns.
1857	420,000	0	0	350,000	0	0	
1858	400,000	0	0	400,000	0	0	
1859	550,000	0	0	650,000	0	0	
1860	270,000	0	0	150,000	0	0	
1861	400,000	0	0	550,000	0	0	
1862	400,000	0	0	350,000	0	0	
1863	250,000	0	0	250,000	0	0	
1864	600,000	0	0	630,000	0	0	
1865	520,000	0	0	460,000	0	0	
1866	410,000	0	0	510,000	0	0	
1867	300,000	0	0	250,000	0	0	
1868	220,000	0	0	200,000	0	0	
1869	250,000	0	0	130,000	0	0	
1870	235,000	0	0	350,000	0	0	
1871	320,000	0	0	600,000	0	0	
1872	1,750,000	0	0	1,250,000	0	0	
1873	650,000	0	0	950,000	0	0	
1874	650,000	0	0	763,029	19	4	
1875	500,000	0	0	650,000	0	0	
1876	325,000	0	0	250,000	0	0	
1877 Jan. 4	65,000	0	0				
" 16	100,000	0	0				
" 24	50,000	0	0				
Mar. 12	15,000	0	0				
June 9	50,000	0	0				
Aug. 3	50,000	0	0				
Oct. 17	50,000	0	0				
Nov. 2	40,000	0	0				
Dec. 18	80,000	0	0				
1877	500,000	0	0				
1877 Jan. 5				50,000			
" 18				50,000			
Mar. 22				25,000			
June 17				75,000			
Aug. 2				25,000			
Oct. 17				50,000			
Nov. 3				100,000			
" 29				25,000			
Dec. 14				40,000			
1877				440,000	0	0	
Balance due to the Exchequer on 31 Dec. 1877				385,000	0	0	
	£	15,738,029	19	£	15,738,029	19	4

Royal Mint,
15th March 1878.

C. W. Fremantle,
Deputy Master of the Mint.

No. VII.

Moneys coined, &c. in the last Ten Years.

* Statement of all Gold, Silver, and Copper (Bronze) Moneys of the Realm, coined at the Mint, and of worn Silver Coin exchanged, &c., from the 1st day of January 1868 to the 31st day of December 1877.

GOLD COINAGE.

Date.	Sovereigns.			Half Sovereigns.			Total Value.
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	
	oz.		£ s. d.	oz.		£ s. d.	£ s. d.
1868	424,625·208	1,653,384	1,653,384 8 0	—	—	—	1,653,384 8 0
1869	1,654,272·155	6,441,322	6,441,322 4 0	239,070·996	1,861,764	930,882 13 9	7,372,204 17 9
1870	468,104·162	1,822,680	1,822,680 11 7	126,021·298	981,408	490,704 7 4	2,313,384 18 11
1871	2,262,799·401	8,810,775	8,810,775 3 4	284,784·820	2,217,760	1,108,880 17 10	9,919,656 1 2
1872	3,504,047·648	13,643,880	13,643,885 10 7	415,423·760	3,235,112	1,617,556 5 3	15,261,441 15 10
1873	611,964·096	2,382,832	2,382,835 4 0	257,267·094	2,003,464	1,001,733 14 11	3,384,568 18 11
1874	133,452·050	519,628	519,628 18 4	241,909·844	1,883,872	941,936 9 1	1,461,565 7 5
1875	—	—	—	62,475·514	486,494	243,264 0 8	243,264 0 8
1876	846,152·264	3,294,790	3,294,705 7 6	360,049·696	2,804,000	1,401,943 10 1	4,696,648 17 7
1877	—	—	—	252,062·638	1,962,800	981,468 17 11	*981,468 17 11
	9,905,416·984	38,569,201	38,569,217 7 4	2,239,065·660	17,436,674	8,718,370 16 10	47,287,588 4 2

SILVER COINAGE.

Date.	Half Crowns.			Florins.			Shillings.		
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.
	oz.		£	oz.		£	oz.		£
1868	—	—	—	326,160·000	896,940	89,694	605,520·000	3,330,360	166,518
1869	—	—	—	108,000·000	297,000	29,700	133,920·000	736,560	36,828
1870	—	—	—	718,560·000	1,976,040	197,604	347,040·000	1,908,720	95,436
1871	—	—	—	1,293,840·000	3,558,060	355,806	876,240·000	4,819,320	240,966
1872	—	—	—	2,516,400·000	6,920,100	692,010	1,612,080·000	8,866,440	443,322
1873	—	—	—	2,169,360·000	5,965,740	596,574	1,179,360·000	6,486,480	324,324
1874	993,600·000	2,185,920	273,240	657,360·000	1,807,740	180,774	1,000,080·000	5,500,440	275,022
1875	505,440·000	1,111,968	138,996	415,440·000	1,142,460	114,246	792,000·000	4,356,000	217,800
1876	288,000·000	633,600	79,200	221,040·000	607,860	60,786	139,680·000	768,240	38,412
1877	203,040·000	446,688	55,836	249,840·000	687,060	68,706	594,000·000	3,267,000	163,350
	1,990,080·000	4,378,176	547,272	8,676,000·000	23,859,000	2,385,900	7,279,920·000	40,039,560	2,001,978

* The amounts for 1877 shown in this Return differ from those given on page 4, as the latter give the number of good pieces actually coined, while the former show the amount of coin delivered to the public, or into store at the Mint Office, during the year.

SILVER COINAGE—*cont.*

Date.	Sixpences.			Fourpences.			Threepences.		
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.
	oz.		£	oz.		£ s. d.	oz.		£ s. d.
1868	97,200·000	1,069,200	26,730	252·000	4,158	69 6 0	66,444·000	1,461,768	18,272 2 0
1869	35,280·000	388,080	9,702	252·000	4,158	69 6 0	204·000	4,488	56 2 0
1870	95,040·000	1,045,440	26,136	252·000	4,158	69 6 0	63,564·000	1,398,408	17,480 2 0
1871	333,360·000	3,666,960	91,674	252·000	4,158	69 6 0	47,004·000	1,034,088	12,926 2 0
1872	343,440·000	3,777,840	94,446	252·000	4,158	69 6 0	50,604·000	1,113,288	13,916 2 0
1873	399,600·000	4,395,600	109,890	252·000	4,158	69 6 0	184,524·000	4,059,528	50,744 2 0
1874	384,480·000	4,229,280	105,732	252·000	4,158	69 6 0	202,524·000	4,455,528	55,694 2 0
1875	295,920·000	3,255,120	81,378	252·000	4,158	69 6 0	150,684·000	3,315,048	41,438 2 0
1876	76,320·000	839,520	20,988	252·000	4,158	69 6 0	83,004·000	1,826,088	22,826 2 0
1877	370,080·000	4,070,880	101,772	252·000	4,158	69 6 0	113,244·000	2,491,368	31,142 2 0
	2,430,720·000	26,737,920	668,448	2,520·000	41,580	693 0 0	961,800·000	21,159,600	264,495 0 0

SILVER COINAGE—*cont.*

Date.	Twopences.			Pence.			Total Value of Silver Coined.	Total Amount Paid for Silver Bullion.
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.		
	oz.		£ s. d.	oz.		£ s. d.	£ s. d.	£ s. d.
1868	144·000	4,752	39 12 0	120·000	7,920	33 0 0	301,356 0 0	80,744 16 6
1869	144·000	4,752	39 12 0	120·000	7,920	33 0 0	76,428 0 0	135,083 0 11
1870	144·000	4,752	39 12 0	120·000	7,920	33 0 0	336,798 0 0	100,483 5 3
1871	144·000	4,752	39 12 0	120·000	7,920	33 0 0	701,514 0 0	720,821 5 9
1872	144·000	4,752	39 12 0	120·000	7,920	33 0 0	1,243,836 0 0	1,544,848 14 8
1873	144·000	4,752	39 12 0	120·000	7,920	33 0 0	1,081,674 0 0	522,957 0 2
1874	144·000	4,752	39 12 0	120·000	7,920	33 0 0	890,604 0 0	421,928 7 9
1875	144·000	4,752	39 12 0	120·000	7,920	33 0 0	594,000 0 0	388,744 17 3
1876	144·000	4,752	39 12 0	120·000	7,920	33 0 0	222,354 0 0	—
1877	144·000	4,752	39 12 0	120·000	7,920	33 0 0	420,948 0 0	310,290 8 9
	1,440·000	47,520	396 0 0	1,200·000	79,200	330 0 0	5,869,512 0 0	4,225,901 17 0

BRONZE COINAGE.

Date.	Pence.			Halfpence.			Farthings.			Total Value of Bronze Coined.	Total Amount Paid for Bronze Bullion and Old Copper Coin.
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.		
	Tons.		£	Tons.		£ s. d.	Tns.cwt.qr.lbs.		£ s. d.	£ s. d.	£ s. d.
1868	11	1,182,720	4,928	17	3,046,400	6,346 13 4	13 10 2 24	4,851,268	5,053 6 10	16,328 0 2	5,059 0 0
1869	24	2,580,480	10,752	18	3,225,600	6,720 0 0	9 0 0 0	3,225,600	3,360 0 0	20,832 0 0	8,855 15 3
1870	53	5,698,560	23,744	24	4,300,800	8,960 0 0	- - -	- -	- -	32,704 0 0	6,726 11 6
1871	12	1,290,240	5,376	6	1,075,200	2,240 0 0	- - -	- -	- -	7,616 0 0	1,196 15 0
1872	80	8,601,600	35,840	25	4,480,000	9,333 6 8	6 0 0 0	2,150,400	2,240 0 0	47,413 6 8	898 17 6
1873	79	8,494,080	35,392	20	3,584,000	7,466 13 4	9 0 0 0	3,225,600	3,360 0 0	46,218 13 4	13,618 9 6
1874	109	11,719,680	48,832	35	6,272,000	13,066 13 4	10 0 0 0	3,584,000	3,733 6 8	65,632 0 0	30,997 8 10
1875	110	11,827,200	49,280	36	6,451,200	13,440 0 0	19 0 0 0	6,809,600	7,093 6 8	69,813 6 8	24,000 2 7
1876	*103	11,074,560	46,144	*38	6,809,600	14,186 13 4	*3 0 0 0	1,075,200	1,120 0 0	61,450 13 4	14,663 14 10
1877	90	9,676,800	40,320	29	5,196,800	10,826 13 4	- - -	- -	- - -	51,146 13 4	9,392 7 9
	671	72,145,920	300,608	248	44,441,600	92,586 13 4	69 10 2 24	24,921,608	25,960 0 2	419,154 13 6	114,902 2 9

* Coined at Birmingham.

Worn Silver Coin purchased for Exchange.

Date.	Weight.	Nominal Value.	Mint Value at 5s. 6d. per oz.	Loss by Exchange.
	oz.	£	£ s. d.	£ s. d.
1868 - -	338,878·297	125,000	106,941 10 6	18,058 2 6
1869 - -	325,976·923	105,000	89,643 13 0	15,356 7 0
1870 - -	356,023·295	115,000	97,906 8 0	17,093 12 0
1871 - -	326,107·111	105,000	89,679 9 1	15,320 10 11
1872 - -	347,584·522	110,686 14	95,585 14 11	15,100 19 1
1873 - -	594,222·521	188,263 6	163,411 3 11	24,852 2 1
1874 - -	496,416·000	156,355	136,514 8 0	19,840 12 0
1875 - -	488,272·973	154,000	134,269 11 3	19,730 8 9
1876 - -	883,640·410	276,000	243,001 2 3	32,998 17 9
1877 - -	**660,016·212**	**207,280**	**181,504 9 0**	**25,775 11 0**
	4,867,138·269	1,542,585	1,338,457 9 11	204,127 10 1

The yearly Average Price paid per ounce for Silver Bullion purchased in the market or coinage in the Years 1868 to 1877, both inclusive, was as follows:—

1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
$60\frac{1}{4}$	$60\frac{5}{16}$	$60\frac{1}{4}$	$60\frac{7}{16}$	$60\frac{5}{16}$	$58\frac{13}{16}$	$58\frac{3}{4}$	$56\frac{7}{8}$	Nil	$56\frac{1}{16}$

The Amount of Seignorage on the Silver Coinage paid into the Exchequer in the Years 1868 to 1877 has been—

1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
18,622 7 4	12,345 4 10	9,027 17 9	55,067 19 4	77,391 12 10	85,680 10 2	101,120 0 0	20,306 10 4	52,286 2 0	*31,439 2 1

* This sum represents the amount of Seignorage on the Silver Coinage actually paid into the Exchequer during the year 18[illegible] whereas the figures given at page 47 represent the amount which accrued during the year on the purchase of bullion.

Royal Mint,
15th March 1878.

C. W. Fremantle,
Deputy Master of the Mint.

No. VIII.

Issue of Bronze Coin, &c., to 31st December 1877.

New Bronze Coin issued during the Year 1877. (Nominal Value.)				Old Copper Coin withdrawn from Circulation during the Year 1877. (Nominal Value.)	Total Issue of Bronze Coin from 17 December 1860 to 31 December 1877. (Nominal Value.)				Total Amount of Old Copper Coin purchased from the Public and withdrawn from Circulation from 17 Dec. 1860 to 31 Dec. 1877. (Nominal Value.)	Amount of New Bronze Coin in Store at the Mint, prepared for issue, on 31 December 1877. (Nominal Value.)			
Pence.	Half-pence.	Far-things.	Total.		Pence.	Half-pence.	Far-things.	Total.		Pence.	Half-pence.	Far-things.	Total.
£ 31,580	£ 7,655	£ 2,815	£ 42,050	£ s. d. 2,284 1 10	£ 897,335	£ 400,427	£ 70,201	£ 1,367,963	£ s. d. 580,360 17 10	£ s. d. 19,050 11 2	£ s. d. 7,402 10 7	£ s. d. 390 18 2	£ s. d. 26,843 19 11

C. W. Fremantle,
Deputy Master of the Mint.

Royal Mint,
15th March 1878.

No. IX.

Verdict of the Jury of the Goldsmiths' Company at the Trial of the Pyx held on the 4th of July 1877.

We, whose names are hereunder written, having been sworn this 4th day of July 1877, before the Queen's Remembrancer, at Goldsmiths' Hall, in the City of London, have made the assays and trials of Her Majesty's gold and silver coins in the Pyx of the Mint, and which, according to accounts produced by the Officers of the Mint, were coined in the said Mint from the 1st day of July 1876 to the 30th day of June 1877, both days inclusive. We ascertained that the number of coins, both of gold and silver, in each packet produced to us, corresponded with the number which the Officers of the Mint represented it to contain, and we took a coin or coins from each of such packets of gold coins, making altogether 10 sovereigns or 20-shilling pieces, and we weighed each of the said coins separately, so as to ascertain whether they were within the remedy prescribed in the First Schedule of the Coinage Act, 1870. We found that the amount of variation from the standard of weight specified in the said First Schedule of the said Act was minus one thousandth part of an ounce (or ·001) on the whole of such coins, and that, therefore, they were within the prescribed remedy as to weight. We then melted the said gold coins, so taken out and weighed, into an ingot, and assayed such ingot, comparing it with the standard gold trial-plate produced by the Board of Trade, so as to ascertain whether the metal was within the remedy as to fineness prescribed in the said First Schedule to the said Act, and we found that the amount of variation thereof from the standard of fineness specified in the said First Schedule to the said Act was five ten-thousandths (or ·0005), and, therefore, that the said metal was within the prescribed remedy as to fineness. We weighed the residue of the said gold coins in bulk, and we ascertained that they were within the remedy as to weight. We then took from such residue six sovereigns, and weighed and assayed them separately, and we found that such sovereigns weighed respectively,—the first, 123·324 grains, the second 123·324 grains, the third 123·324 grains, the fourth 123·324 grains, the fifth 123·304 grains, and the sixth 123·264 grains. We then assayed the said six sovereigns separately, and we found the millesimal fineness of such

sovereigns to be 916·5, 916·2, 916·5, 916·7, 916·3, and 916·4 respectively. We also took a coin from each of such packets of silver coins, making altogether 12 half-crowns, 6 florins, 17 shillings, 12 sixpences, and of Maundy moneys, 1 fourpenny piece, 6 threepences, 1 twopenny piece, and 6 penny pieces, and weighed each of the said silver coins separately, so as to ascertain whether they were within the remedy of the said First Schedule of the said Coinage Act, 1870. We found that the amount of variation from the standard of weight specified in the said First Schedule of the said Act was minus one thousandth part of an ounce (or ·001) on the whole of such coins, and that, therefore, they were within the prescribed remedy as to weight. We then melted the said silver coins, so taken out and weighed, into an ingot, and assayed such ingot, comparing it with the standard silver trial-plate produced by the Board of Trade, so as to ascertain whether the metal was within the remedy as to fineness prescribed in the said First Schedule to the said Act, and we found that the amount of variation from the standard of fineness specified in the said First Schedule to the said Act was minus six ten-thousandths (or ·0006), and, therefore, that the said metal was within the prescribed remedy as to fineness. We weighed the residue of the said silver coins in bulk, and we ascertained that they were within the remedy as to weight. We then took from such residue one half-crown, one florin, one shilling, and one sixpence, and weighed and assayed them separately, and we found that such half-crown weighed 217·681 grains, that such florin weighed 174·245 grains, that such shilling weighed 87·472 grains, and that such sixpence weighed 43·636 grains. We then assayed the said half-crown, the said florin, the said shilling, and the said sixpence, separately, and we found the millesimal fineness of such half-crown to be 924·0, of such florin to be 924·5, of such shilling to be 924·7, and of such sixpence to be 924·5.

G. Smith Hayter, Foreman.
H. J. Lias.
John Gray.
H. S. Thornton.
G. Matthey.
Stewart Pixley.
F. B. Thomas.
Henry Lias.
R. Ruthven Pym.
Wm. Robinson.
H. Matthey.
Hy. Pizey.

W. F. Pollock,
Queen's Remembrancer.

No. X.

Report of the Deputy Master of the Sydney Branch of the Royal Mint for the year 1877.

Sir, Royal Mint, Sydney, 31st December 1877.

I have the honour to submit, for the consideration of the Master of the Mint, my Ninth Annual Report on the Sydney Branch of the Royal Mint.

During the year 1877 the Colony of New South Wales still suffered from one of those cycles of drought which appear to be of periodical recurrence, and which must seriously interfere with the work of the gold-digger, to whom an abundance of water is an essential requisite. This may be the reason for the diminution, still progressive, in the productiveness of the Gold Fields, which better seasons and more favourable conditions may perhaps improve.

There was a considerable increase in the quantity of gold received from the neighbouring Colony of Queensland.

The quantity of gold received for coinage was 438,385 ounces, amounting in value to 1,608,248*l.* Of this amount New South Wales contributed 459,201*l.* and Queensland 1,226,315*l.* New Zealand only sent 4,655*l.*

The coinage amounted to 1,590,000*l.* sovereigns, and 6,656*l.* was issued besides in the shape of bar gold.

The amount of the revenue received and paid over to the Colonial Government was 10,902*l.*; an additional sum of 1,644*l.* was also paid over as the saving on the preceding year.

The expenditure amounted to 12,320*l.*

During the year the new regulation for the re-coinage, free of charge, of light gold coin of the realm was taken advantage of to the extent of 10,086*l.*

The amount of worn silver coin withdrawn from circulation was 7,915*l.*, which was melted into bars and sold at from 49*d.* to 52*d.* per ounce, producing 4,579*l.* 6*s.* 10*d.*, and leaving a loss of 2,435*l.*, 13*s* 2*d.*, which was replaced as usual by drafts on the Master of the Mint.

The total quantity of worn silver coin withdrawn from circulation now amounts to 41,497*l.*, of which 32,028*l.* was circulating in New South Wales, 3,750*l.* in Queensland, and 5,719*l.* in Tasmania. The new Colony of Fiji also used this Mint for the purification of its circulation of old dollars and foreign coins, nominally valued at 1,376*l.*, which realized for the benefit of that Colony the sum of 1,060*l.*

726*l.* in bronze coin was issued, when the store became exhausted; an additional supply of 1,000*l.* which has just arrived will be gladly welcomed.

The renovation in New South Wales of the copper circulation, which was in a deplorable condition, was undertaken in 1868, since which a sum of 17,000*l.* in bronze coin has been issued by this Mint. It is significant of the completeness of the operations of 1868 that although the utmost encouragement has since been given to the collection of old copper coin and its exchange for new bronze coin in even the smallest quantities, the whole amount of old copper coin thus received during the last nine years has only amounted to 273*l.* 14*s.* 5*d.*, which was remitted to the Master of the Mint, and the exchange finally closed.

These details will show that the Colony of New South Wales has taken advantage of the liberal arrangements of the Imperial Government and the presence of a Branch of the Royal Mint to maintain the coin of each kind in a state of integrity; and the result is evident in the circulation, which is in a very satisfactory condition.

During the past year the driving wheel of the duplicate steam-engine has been re-geared, and the engine itself taken to pieces and thoroughly repaired in every part. A great improvement has also been made by the substitution of a Seller's self-adjusting injector to feed the boilers, for the old feed-pumps attached to the engines.

Mr. Taylor, a representative of the firm which constructed the machinery of this Mint, lately visited the establishment when passing through Sydney in the course of a tour round the world. It was gratifying to receive Mr. Taylor's spontaneous and unqualified testimony to the good condition of the machinery and the value of the improvements which have been made on its original construction; and it was useful to have the benefit of Mr. Taylor's experience of later years, particularly in regard to improved rollers and the supply of good steel, from which the Mint may hope to derive some advantage.

The Colonial Government having provided quarters within the enclosure of the Mint for the Melter and Refiner, the establishment has now the advantage of a second resident officer.

A Return of the gold received and coin and bullion issued, and of the revenue received from the commencement to the 31st December 1877, is appended.

I have, &c.,
C. ELOUIS,
Deputy Master.

The Deputy Master,
Royal Mint, London.

Gold Received and Issued at the Mint.

Return showing the Quantity and Value of Gold received and issued at the Sydney Branch of the Royal Mint, from its opening on the 14th May 1855 to the 31st December 1877, inclusive.

Period.	Gold Dust or Bullion received for Coinage.		Issued.						Total Value of Coin and Bullion.	Revenue.		
			In Coin.			In Bullion.				From Gold, the Produce of New South Wales.	From other Sources.	Total Revenue.
	Weight.	Value at £3 17s. 10½d. per oz.	Sovereigns.	Half-sovereigns.	Total Value of Coin.	Weight.	Value at £3 17s. 10½d. per oz.					
	ozs.	£ s. d.	No.	No.	£ s. d.	ozs.	£ s. d.		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1855, 14 May to 31 Dec.	217,589·205	871,300 2 6	502,000	21,000	512,500 0 0	1,221·970	4,758 0 11		517,258 0 11	3,211 14 5	2,196 0 2	5,407 14 7
1856, 1 Jan. to 31 Dec.	239,491·990	939,776 6 5	981,000	478,000	1,220,000 0 0	654·850	2,549 16 5		1,222,549 16 5	8,079 14 0	4,476 10 7	12,556 4 7
1857 " "	223,215·890	879,181 19 4	499,000	537,000	767,500 0 0	14,889·330	57,977 5 7		825,477 5 7	6,001 11 11	4,839 2 11	10,840 14 10
1858 " "	342,540·530	1,332,034 3 1	1,161,500	483,000	1,343,000 0 0	14,927·920	58,125 11 10		1,401,125 11 10	13,192 12 11	4,955 12 4	18,148 5 3
1859 " "	353,127·000	1,380,402 14 10	1,050,500	341,000	1,221,000 0 0	39,591·620	156,557 5 3		1,377,557 5 3	14,641 9 2	4,321 12 1	18,963 1 3
1860 " "	470,464·300	1,823,637 16 11	1,573,500	156,000	1,651,500 0 0	48,543·520	195,052 9 2		1,846,552 9 2	16,618 6 4	5,011 3 0	21,629 9 4
1861 " "	477,607·470	1,863,632 2 0	1,626,000	186,500	1,719,250 0 0	24,880·005	98,187 0 6		1,817,437 0 6	19,000 16 8	3,567 5 3	22,568 1 11
1862 " "	696,311·580	2,700,452 1 1	2,477,500	—	2,477,500 0 0	74,995·174	298,191 14 4		2,775,691 14 4	26,805 10 2	6,001 7 11	32,806 18 1
1863 " "	493,332·110	1,908,526 17 6	1,255,500	558,500	1,534,750 0 0	84,549·596	342,212 9 10		1,876,962 9 10	18,555 6 8	5,047 6 3	23,602 12 11
1864 " "	728,019·350	2,878,398 17 10	2,698,500	—	2,698,500 0 0	44,897·291	182,168 4 3		2,880,668 4 3	14,399 0 10	12,496 14 3	26,895 15 1
1865 " "	598,606·740	2,351,402 0 10	2,130,500	282,000	2,271,500 0 0	21,913·669	88,061 13 9		2,359,561 13 9	14,033 3 9	9,777 5 4	23,810 9 1
1866 " "	739,362·930	2,935,923 7 9	2,911,000	—	2,911,000 0 0	11,113·931	44,732 8 2		2,955,732 8 2	11,784 13 5	13,226 7 5	25,011 0 10
1867 " "	629,721·990	2,501,363 19 9	2,370,000	62,000	2,401,000 0 0	22,666·213	91,853 15 3		2,492,853 15 3	10,099 15 4	10,070 11 8	20,170 7 0
1868 " "	605,806·840	2,359,525 10 1	2,319,000	—	2,319,000 0 0	6,581·244	26,728 8 1		2,345,728 8 1	8,946 19 1	10,570 6 7	19,517 5 8
1869 " "	346,003·940	1,323,487 8 3	1,202,000	154,000	1,279,000 0 0	9,936·444	40,388 2 2		1,319,388 2 2	6,601 13 1	8,686 13 2	15,288 6 3
1870 " "	317,527·960	1,218,730 4 8	1,220,000	—	1,220,000 0 0	5,983·456	23,298 1 9		1,243,298 1 9	4,607 8 11	6,952 4 7	11,559 13 6
1871 " "	778,627·290	2,887,601 16 5	2,814,000	—	2,814,000 0 0	14,489·542	56,418 13 1		2,870,418 13 1	7,316 18 3	11,570 16 6	18,887 14 9
1872 " "	558,342·450	2,063,774 12 10	1,815,000	356,000	1,993,000 0 0	25,355·527	98,728 2 1		2,091,728 2 1	9,539 19 5	8,249 5 2	17,789 4 7
1873 " "	436,624·910	1,611,940 17 1	1,478,000	—	1,478,000 0 0	13,088·423	50,963 1 5		1,528,963 1 5	7,234 10 10	5,152 7 11	12,386 18 9
1874 " "	551,046·650	2,073,666 19 11	1,899,000	252,000	2,025,000 0 0	2,982·124	11,611 12 8		2,036,611 12 8	6,725 6 9	7,389 1 5	14,114 8 2
1875 " "	547,484·680	2,061,070 16 5	2,122,000	—	2,122,000 0 0	1,673·786	6,517 6 0		2,128,517 6 0	5,714 15 10	7,350 16 1	13,565 11 11
1876 " "	451,995·270	1,695,557 19 8	1,613,000	60,000	1,643,000 0 0	2,129·789	8,292 17 4		1,651,292 17 4	3,941 8 10	6,554 15 4	10,496 4 2
1877 " " (A.)	433,385·500	1,608,248 2 8	1,590,000	—	1,590,000 0 0	1,709·643	6,656 18 7		1,596,656 18 7	3,316 9 11	7,586 9 9	10,902 19 8
Grand Total - (A.)	11,226,146·575	43,179,641 17 10	39,248,500	3,927,000	41,212,000 0 0	488,775·572	1,950,030 18 5		43,162,030 18 5	240,369 6 6	166,549 15 8	406,919 2 2

(A.)—Countries from which imported:

Country.	During the year 1877. Quantity. ozs.	Value. £ s. d.	Since the opening of the Mint. Quantity. ozs.	Value. £ s. d.
New South Wales	121,593·380	459,201 4 4	5,976,042·320	22,952,590 4 2
Victoria	132·740	225 13 4	1,437,585·275	5,905,080 16 1
New Zealand	1,674·000	4,655 12 3	1,751,934·760	6,882,408 15 1
Queensland	310,246·680	1,126,315 2 6	2,004,240·780	7,226,820 0 10
Tasmania	—	—	5,692·450	21,982 19 6
South Australia	822·150	2,806 17 5	1,265·350	4,402 9 9
California	—	—	2,242·930	8,225 4 4
British Columbia	—	—	218·670	759 9 0
New Caledonia	373·950	1,326 10 5	6,005·180	21,438 2 10
Coin	3,542·600	13,717 2 5	40,918·860	155,933 16 3
Totals	438,385·500	1,608,248 2 8	11,226,146·575	43,179,641 17 10

Royal Mint, Sydney,
31st December 1877.

C. Elouis,
Deputy Master.

No. XI.

Report by the Deputy Master of the Melbourne Branch of the Royal Mint for the year 1877.

Sir, Melbourne, 9th January 1878.

I have the honour to submit for your consideration my Report on this Branch of the Royal Mint for the year 1877.

Major-General Ward resigned the Deputy Mastership on the 1st August last, and the Lords Commissioners of Her Majesty's Treasury were pleased to grant him a retired allowance from that date.

The coinage of the year has been 1,527,000*l.* (of which 40,000*l.* was in half-sovereigns), being less by 597,000*l.* than that of 1876, although the export of coin during the year has been unusually large.

The gold received for coinage and refined by the chlorine process amounted to 378,310 ounces, from which 20,426 ounces of silver were extracted, the greater part of which was sold to jewellers and others for manufacturing purposes. As the balance remaining at the end of the year was small, it was not considered advisable to ship it to England in accordance with the arrangement made with the Master of the Mint.

The weight of standard gold bars prepared and passed into work was 724,630 ounces, from which 392,830 ounces of coin were produced. Owing to the changes made in the working staff of the Coining Department during the early part of the year, the per-centage of good work fell off considerably, and the average for the year does not exceed 55¼ per cent. of sovereigns on the weight of bars operated on.

The waste for the year has been 98*l.* 16*s.* 11*d.* in melting, refining, and assaying, and 24*l.* 4*s.* 4*d.* in coining, making a total of 123*l.* 1*s.* 3*d.*, and at the rate of 81*l.* per million issued.

Owing to the decrease in the quantity of gold brought for coinage, the revenue has been only 6,514*l.* 5*s.* 9*d.*

In accordance with the instructions conveyed in the letter of the Deputy Master and Comptroller dated 13th April last, the saving on the Mint Annuity for the year 1876, amounting to 7,104*l.* 6*s.* 4*d.*, has been paid to the Colonial Treasury.

In addition to the usual repairs and alterations, there have been made in the Mint workshops during the year three sets of standard bar moulds of a new pattern, a grinding machine for dies and holders, and a marking machine, all of which were designed and constructed under the superintendence of George Bint, the Foreman of the Coining Department. New gauges have also been fitted to the trial-press, introducing an improvement, suggested by W. Barker, in the method of cutting out blanks, by which the proportion of blanks cut from bars has been increased by over three per cent.

In consequence of the dismissal of the Gauger at the end of January I recommended that the offices of Foreman of Machinery and Gauger should be abolished, and that George Bint, who has had charge of the machinery since the opening of the Mint, should be appointed Foreman of the Coining Department. The Lords Commissioners of Her Majesty's Treasury were pleased to approve of this alteration as a provisional measure, and of my being called upon to report on the result at the end of twelve months. The new arrangement has been most satisfactory.

Mr. J. R. D. Bethune, having resigned his appointment, retired from the service on the 30th November last. A young gentleman, who has passed the University examination, has been engaged temporarily as a Writer until arrangements can be made for filling the vacancy by competition, in accordance with the regulations of the Lords Commissioners of Her Majesty's Treasury.

Having proposed in a letter to his Excellency the Governor, which was approved by his Excellency and forwarded in my letter to the Deputy Master and Comptroller of 19th December 1876 for submission to the Lords Commissioners of Her Majesty's Treasury, that the maximum salaries of Junior Clerks should be increased from 180*l.* to 250*l.* per annum, their Lordships have been pleased to approved of the arrangement recommended by the Deputy Master and Comptroller that the four officers below the rank of Senior Clerk in this

establishment should be constituted a class of Junior Clerks with the same scale of salaries as that sanctioned in the case of the Sydney Mint establishment, viz., 100*l.* to 250*l.* a year, with the following increments:—for the first four years (after appointment) 10*l.* a year, for the next four years (after appointment) 12*l.* 10*s.*, and after that time 15*l.* a year.

The copper coinage ceased to be legal tender in Victoria on the 30th September. The Lords Commissioners of Her Majesty's Treasury having approved of the recommendation of the Master of the Mint that this Branch of the Royal Mint should assist in the withdrawal from circulation of the old coin, bronze coin of the value of 2,000*l.* was transmitted to this Mint to exchange for the copper coin brought to it for withdrawal. Of this 472*l.* 15*s.* 6*d.* was delivered in exchange for the copper coin, which was received until the 20th October, and was shipped to London in time to ensure its arrival before the close of the year; and the remainder was offered for sale to the public. Coin of the value of 919*l.* 13*s.* had been sold before the end of the year, leaving a balance in hand of 607*l.* 11*s.* 6*d.* Charges amounting to 13*l.* 9*s.* in connection with the exchange of the new for the old coin were incurred on account of the Royal Mint, London, under the authority of the letter of the Deputy Master and Comptroller dated 16th February last.

A new method of weighing by compensation proposed by Mr. George Foord has been in constant use in the Assay Department for the last seven months with most satisfactory results. The method is easy in its application. It prevents those small errors which may arise from defect of the beam, and has a general tendency to improve the character of the work. As the subject is of considerable interest to all engaged in the assay of bullion, an abstract of Mr. Foord's paper is appended. Appendix "A."

A Return is attached of the quantity and value of gold received for coinage, and of the coin and bullion issued, and of the revenue derived from the Mint from its opening until the end of the year 1877. Another Return shows the quantity and destination of gold coin exported from Victoria, and the amount issued from the Mint in each month of the same year. Appendix "B." Appendix "C."

I have, &c.,
ROBERT HUNT,
Acting Deputy Master.

The Right Honourable
The Master of the Mint, London.

APPENDIX "A."

ABSTRACT from a Paper on a proposed New Method of Weighing, applicable to the Gold Bullion Assay:—by George Foord. Read before the Royal Society of Victoria, 8th November 1875.

Only one minor alteration of the pattern of the beam is proposed,—that, namely, which concerns the range of the rider. It is suggested that an off-shoot from the cam for supporting the latter be formed, so as to become rigidly a part of the beam, and allow the rider to rest over the outer knife-edge, or on any position intermediate between that and the centre knife-edge of the beam. The range of the rider thus includes the whole extent of one arm of the balance.*

TABLE OF NEW SERIES OF COMPENSATING WEIGHTS.

Real amount of weight	·1 gr.	·2 gr.	·3 gr.	·4 gr.	·5 gr.
Mark „ „	·98	·97	·96	·95	·94
Real amount of weight	·6 gr.	·7 gr.	·8 gr.	·9 gr.	1·0 gr.
Mark „ „	·93	·92	·91	·9	·89
Real amount of weight	1·1 gr.	1·2 gr.	1·3 gr.	1·4 gr.	1·5 gr.
Mark „ „	·88	·87	·86	·85	·84
Real amount of weight	1·6 gr.	1·7 gr.	1·8 gr.	1·9 gr.	
Mark „ „	·83	·82	·81	·8	

There is also to be provided a rider of the real weight of ·1 grain, as usual.

* Professor Wm. Harkness, of the U.S. Naval Observatory, has pointed out that this requirement would be met by the simple device of a beam whose arm is marked with 12 major divisions, upon 10 of which a rider weighing ·12 of a grain is used.

The method of employing these weights is shown by the following examples:

Fineness Indicated.					Load.			
Real Weight of Cornet.	Mark of Weight added.	Position of Rider indicates		Fineness therefore indicated.	Real Weight of Cornet.	Real Value of Weight added.	Virtual Weight of Rider.	Total Load, Cornet, Weight, and Rider.
					Grains.	Grain.	Grain.	Grs.
·9433	·94	+ ·0033	=	·9433	9·433	+ ·500	+ ·067	= 10
·9999	nil.	+ ·0099	=	·9999	9·999	+ nil.	+ ·001	= 10
·9172	·91	+ ·0072	=	·9172	9·172	+ ·800	+ ·028	= 10
·8426	·84	+ ·0026	=	·8426	8·426	+ 1·500	+ ·074	= 10
·8016	·80	+ ·0016	=	·8016	8·016	+ 1·900	+ ·084	= 10
·9652	·96	+ ·0052	=	·9652	9·652	+ ·300	+ ·048	= 10
·9789	·97	+ ·0089	=	·9789	9·789	+ ·200	+ ·011	= 10

The notation involved in this method is as easy as that of the old practice; the index readings are also as facile. Thus, suppose a cornet, weighing ·9958, to be placed in the pan without any other weight, and the rider put on the division marked 60, this would read ·9960; but, as the beam now carries a real weight of only 9·958 + ·040 = 9·998, it will show two divisions of the scale light on the right-hand pan or cornet side. We may, therefore, either move the rider back to the ·0058, when the beam will have its full load of ·9958 + ·0042 = 10 grains, making an equipoise, or we may compute this ·9960 — ·0002 = ·9958; for, with any given reading of the weights, what falls short of an equipoise is so much deficiency of the cornet below the fineness indicated, and this must be deducted from the reading to arrive at the real weight of the cornet. Conversely, with any given reading of the weights, what is shown by the index to be in excess of an equipoise is so much excess weight of the cornet beyond the fineness indicated by the weights, and this must be added to the reading of the weights in order that the real weight of the cornet may be arrived at.

The special advantages of the method are the following:—

1. The proposed method is in all respects equivalent to double weighing; it is independent of the relative lengths of the arms of the beam, whether arising from original imperfect workmanship, or from permanent molecular alteration, or from daily vicissitude.

2. The weighings are all made with an uniform load, which satisfies another condition of accuracy more exactly than the common method, the sensitiveness of the beam varying with the load.

3. Substituting the proposed new series of weights for the old, we devote the latter henceforth to the purposes of reference, upon which application a few sentences may now be bestowed.

With the rider over the end knife-edge, each weight of the new series added to that bearing the same mark in the old series should effect an equipoise thus:—

Old series + New series + Rider = 10 grains.

Mark.	Real Weight.	Real Weight.	
·99	9·9 grains +	·0 + ·1 grain	= 10 grains.
·98	9·8 „ +	·1 + ·1 „	= 10 „
·97	9·7 „ +	·2 + ·1 „	= 10 „

and so on. For further verification of the new weights, interchanges too obvious to require explanation, can be employed. Now, supposing a weight of the new series to have worn in use, say, for example, that the weight

marked ·97 has become a thousandth of a grain short of its real weight (·2 of a grain), the deficiency becomes evident on placing it in the pan with ·97 reference weight, the rider being also placed in the pan or over the end knife-edge. This combination of weights will fall short of an exact equipoise by ·001 of a grain.

To make a fresh weight in place of the defective one, we have only to fashion and reduce a piece of platinum or gold until, with the old ·97 weight and the rider, an equipoise is effected.

Where the results of two assayers are employed, as in the Melbourne branch of the Royal Mint, and when one practises the ordinary routine, the other weighing by compensation, any slight deviation due to the wear of the weights will cause errors in opposite directions, and the tendency will be for these to neutralize each other in the mean results obtained.

GEORGE FOORD.

APPENDIX "B."

RETURN of the Quantity and Value of Gold received for Coinage at the Melbourne Branch of the Royal Mint; of the Gold Coin and Gold Bullion issued therefrom; and of the Revenue derived from Mint Charges, &c., from the opening of the Mint on 12th June 1872 to the 31st December 1877.

Period.	Gold received for Coinage.		Issued.						Revenue.		
			In Coin.			In Bullion.		Total Value of Coin and Bullion.	From Mint Charges on Gold.	From Sale of Silver and other Sources.	Total Revenue.
	Gross Weight.	Value of Gold at 3*l.* 17*s.* 10½*d.* per oz. standard.	Sovereigns.	Half-sovereigns.	Total Value.	Quantity.	Value.				
	oz.	£ s. d.	No.	No.	£	oz.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1872*	190,738·14	764,917 6 9	748,000	—	748,000	1,205·468	3,610 9 7	751,610 9 7	2,655 19 11	1,289 6 6	3,945 6 5
1873	221,870·44	887,126 15 6	752,000	165,000	834,500	3,106·902	11,035 6 6	845,535 6 6	3,492 10 3	1,628 17 3	5,121 7 11
1874	335,317·62	1,349,101 17 3	1,373,000	—	1,373,000	2,911·722	10,416 10 0	1,383,416 10 0	4,861 14 9	1,692 17 10	6,554 12 7
1875	489,731·59	1,947,712 14 3	1,888,000	—	1,888,000	3,552·872	13,857 4 8	1,901,857 4 8	4,514 13 0	3,412 17 2	7,927 10 2
1876	543,198·59	2,149,480 17 6	2,124,000	—	2,124,000	3,624·578	14,144 10 1	2,138,144 10 1	3,960 12 4	4,192 12 5	8,153 4 9
1877	378,310·33	1,491,819 4 9	1,487,000	80,000	1,527,000	3,326·060	13,004 4 9	1,540,004 4 9	2,856 5 7	3,658 0 2	6,514 5 9
Total (A.)	2,159,166·71	8,590,158 16 0	8,372,000	245,000	8,494,500	17,726·702	66,068 5 7	8,560,568 5 7	22,341 16 3	15,874 11 4	38,216 7 7

*From 12th June, the day the Mint opened to the public.

(A.) Countries from which imported:

Country.	During the Year 1877.	Since the opening of the Mint.
	oz.	oz.
Victoria	290,919·84	1,603,651·83
New South Wales	357·40	1,771·03
New Zealand	67,718·16	471,356·03
Queensland	59·89	1,390·96
South Australia	10,939·28	45,091·09
Tasmania	6,653·64	29,118·25
Natal	181·47	916·43
Unknown	1,400·65	5,871·09
Totals	378,310·33	2,159,166·71

Royal Mint, Melbourne,
9th January 1878.

ROBERT HUNT,
Acting Deputy Master.

APPENDIX "C."

RETURN showing the Amount and Destination of Gold Coin exported from Victoria, and the Amount issued from the Mint, in each Month of the Year 1877.

Month.	To where Exported.							Total Amount Exported.	Amount issued from Mint.	Excess of Sovereigns issued from Mint over Sovereigns Exported.	Excess of Sovereigns Exported over Sovereigns issued from Mint.
	United Kingdom.	N. S. Wales.	New Zealand.	South Australia.	Tasmania.	Ceylon.	Sumbawa.				
	£	£	£	£	£	£	£	£	£	£	£
January	—	—	—	20,000	—	230,955	1,000	251,955	151,000	—	100,955
February	—	—	—	—	10,000	261,150	—	271,150	156,000	—	115,150
March	—	729	35,000	—	—	328,800	—	364,529	172,000	—	192,529
April	—	—	100,000	50,000	10,000	242,652	—	402,652	112,000	—	290,652
May	—	80	—	—	10,000	362,600	—	372,680	65,000	—	307,680
June	—	100	23,000	—	10,000	81,000	—	114,100	59,000	—	55,100
July	—	—	55,000	—	5,000	129,051	—	189,051	120,000	—	69,051
August	—	—	—	2,000	—	31,800	—	33,800	142,000	108,200	—
September	73,000	—	—	9,000	10,000	35,150	—	127,150	175,000	47,850	—
October	20,000	100	—	—	—	267,673	—	287,773	155,000	—	132,77
November	25,000	750	—	—	—	87,415	—	113,165	149,000	35,835	—
December	99,102	—	—	30,000	—	157,800	—	286,902	71,000	—	215,902
Total	217,102	1,759	213,000	111,000	55,000	2,216,046	1,000	2,814,907	1,527,000		

Royal Mint, Melbourne,
23rd January 1878.

F. BOWYER MILLER,
Acting Deputy Master.*

*Mr. Miller, First Clerk of the Bullion Office, acted as Deputy Master at Melbourne between the dates of Mr. Hunt's departure and Mr. Broughton's arrival.

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